

# Report of the National Institute of Science and Technology in Astrophysics (INCT-A) – 2009-2015

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## ***What is the INCT-A? – An executive summary***

### ***Context***

Brazilian Astronomy, although young, has already made some important achievements. The first graduate programs were established in the 1970's and, since then, the community experimented continuous and vigorous growth. Today nearly 30 institutions support of astronomical research at some level. The first scientific equipment were planned and built in the early 1970's; an important strategic step was the construction of LNA – the first (and for long time the only one) national laboratory to operate in Brazil. Thanks to this laboratory, Brazilian Astronomy experienced a growth, both in quantity and in quality. This allowed joining the Gemini and SOAR consortia in the 1990's. These consortia operate world class astronomical instruments.

The situation of optical and infrared astronomy is, thus, quite favorable. The participation in the Gemini and SOAR consortia has put our community in contact with the best practices of science management and, at the same time, integrated networks of specialists. Although the SOAR telescope does not have its full instrumentation operational, we already can state that Brazilian contribution to the publications of both Gemini and SOAR consortia is at the highest ranking. At the same time the perspective of world-class instrumentation has revitalized the various groups and attracted young talented people to the graduate programs.

For the next decade, world astronomy is planning new and significant steps. At all wavelengths, a next generation of telescopes is under construction: optical 20-40m class (GMT, TMT, ELT) telescopes, radio-interferometers (ALMA, SKA), a new

generation of space-borne instruments (*IXO*, *Webb*) and a large deep optical survey telescope (*LSST*). Many of these equipments are multinational initiatives, given the high costs involved, some of them, in the range of a billion dollars and will take 10 to 15 years to be built. Direct participation in such projects is beyond our possibilities, but there are niches from which our astronomy may benefit. The form and intensity of these benefits depend on some new investments but mostly on careful and strategic planning. If this is not done, our community will have less and less opportunities in the international scenarios for the coming decades.

In the present INCT, a significant number of researchers from many institutions meet, to plan and implement actions, having in mind the future of Brazilian Astronomy. We are researchers from diverse institutions and of distinct specialties, but we all need the same scientific infrastructure and above all, similar collective strategies. These are the characteristics that provide the **unity** to this initiative. These strategies are more and more necessary, given the high costs of the new research equipment and timescales needed for their construction.

Our community already has a national laboratory (LNA) that operates the national infrastructure in optical and infrared astronomy. The INCTA aims toward a partnership with LNA and other institutions to mobilize the community in fostering the best insertion of Brazilian Astronomy in the great international projects underway and those that still will be proposed.

Moreover, we want to promote the culture of technological innovation by supporting the development of world class instrumentation aimed at basic research.

If in the recent past Brazilian Astronomy has advanced in a significant way, its future depends on our planning and organization capabilities. New large and expensive projects are under way in the developed countries, many of them in the form of international consortia, given their high costs, which are prohibitive toward our direct participation. However it is possible to create alternative routes, identifying niches that can bring benefits to our science through creative strategies of international cooperation.

Such associations will increase the networking, both institutional and individual, showing us the best international practices of organization, planning and management of science. This effort is of fundamental importance to provide the environment for the next generation of scientist to perform frontier research.

The “Instituto Nacional em Ciência e Tecnologia em Astrofísica – INCTA”, in addition to the host institute, has one associated laboratory (LNA), 3 other MCT research institutes, 14 federal universities, 3 state universities and 6 private universities, comprising a total of 32 research groups, 12 being consolidated and 20 emerging ones in 27 different institutions. A total of 173 PhD scientists are joining the institute; 79 of them have CNPq scientific productivity fellowship, 12 being level 1A.

## **Mission**

The mission of the National Institute of Science and Technology in Astrophysics is to insert Brazilian Astronomy into the future of the World Astronomy.

## **Strategic Goals**

**1- Maximizing the return from the Gemini and SOAR telescopes.**

a) *Scientific return: Brazil already presents the highest productivity index among the Gemini partners (Brazilians have used 2.3% of the time and published 10% of the papers). For the SOAR telescope this statistical comparison is still premature as the telescope was built about 5 years later than Gemini. Surely the numbers that matter are not only the number of papers. Quality is also relevant. As a goal, we propose that Brazil maintains the leadership in scientific productivity for both Gemini and SOAR consortia for the next 5 years.*

b) *Graduate programs: There are 11 graduate programs that offer Master+PhD programs in Astronomy (USP; UFRGS; UFMG; ON; INPE; UFRN; UFSC; UNIVAP; UFSM; OV-UFRJ, FEG-UNESP). Another 4 offer master degree only (UNICSUL; UNIFEI; UESC; UERN). The possibilities opened with the access to the Gemini and SOAR telescopes have attracted many new talented people to Astronomy. Today we have a good number of promising talented young people in our graduate programs and integrating them in the scientific production with the use of large telescopes and world-class instruments is one of the most effective ways of attracting and educating more talented people. Our goal is to double the number of papers published by Brazilian graduate students with data from the Gemini and SOAR telescopes in the next 3 years (2009-11 compared to 2006-08) with a following growth of 15% per year.*

c) *Supporting emerging groups: Besides attracting and educating talented people, we also want them to get a job in our country. Our major research institutes seem to be saturated growth wise. At the same time, the vast majority of universities do not have a single astronomy professor. In recent years Brazilian Astronomy has, in fact, experimented a new phenomenon: non-traditional universities, both public and private, have hired a number of young and productive astronomers in their faculty. These new groups, often very small in number, need to be supported, integrated in networks and have access to the best existing equipment. Our goal is to double the number of papers published with authors from emerging groups with data obtained from Gemini, SOAR and alike, for the next 3 years, followed by a growth of 15% per year. Among other incentives, INCTA will provide support to their research, by supplying computer equipment to researchers that obtain observing time with large telescopes provided they are justified within the aims of the Institute. We propose to support the participation of people from emerging groups in scientific meetings when presenting results from large telescopes. These groups will also have access to financial support to foster national and international networking, that is, contact with scientists for seminars, to avoid intellectual isolation, as most of these groups are located far from the main centers.*

d) *Stimulate the development of instrumentation for the Gemini and SOAR telescopes. The Brazilian participation in the Gemini and SOAR consortia has allowed, for the first time, the effective construction of modern instruments for large telescopes. Currently Brazil is concluding the construction of the SIFS – SOAR Integral Field Spectrograph – with 1300 fibers, capable of operating with adaptive optics. Other two instruments are in distinct phases of construction: the Steles (high resolution spectrograph) and the BTFI (Fabry-Perot large field imaging spectrograph). Our goal: to conclude the construction and commissioning of the three instruments underway and begin a new one in the next three years.*

**2 – Brazilian Astronomy in the era of the LSST and ELT projects.** The next generation of large telescopes is being planned now. The GMT, TMT and E-ELT are in the process of starting their construction. It is important for Brazilian astronomy to establish a strategy for the era of ELTs, that will be operational by the year 2020. The Large Synoptic Survey Telescope, on the other hand, is a North-American initiative for building and operating a telescope of 6.5 m effective aperture (8.4m nominal) to monitor the sky in 6 filters. This will be a deep survey with an unprecedented approach in the sense that it will revisit the same regions in the sky at about every 4 days, so that it will add a temporal dimension to the data. The magnitude limit for single observations will be  $r \sim 24$  and it will have a cumulative limit of  $r \sim 27.5$ . This project has 4 main broad goals: a) the nature of dark energy and dark matter; b) The transient sky; c) The structure of the Milky Way and d) The structure of the Solar System. This project will make some observations available in real time having profound impact on Brazilian Astronomy.

**3 – Virtual observatories.** Great part of the data from space missions and also from ground

based telescopes is available in databases. These datasets contain a wealth of information and mining them may be of enormous benefit to Brazilian Astronomy, without proportional financial investments. Significant effort in software is imperative to make the appropriate and necessary development. Our goal is to have an operational network of virtual observatories in Brazil within the next 3 years.

**4 – New projects of scientific equipment.** A minimum of 3 new projects, to be defined by the Science committee, will be elaborated and proposed: at least one in radio-astronomy, at least one scientific satellite and at least one in optical/infrared astronomy. These projects will be elaborated to the point where they can be presented to the funding agencies or to possible international partners.

**5 – Education activities:** Brazil has currently about 300 000 teachers of Science and Mathematics. The content and knowledge of Astronomy is minimum. We propose to organize a distance learning course on Astronomy for science teachers all over the Country. The idea is to establish a virtual ambient for an online “distance learning course”. We propose to establish partnerships with the State Governments and Universities to create a large network to foster this idea.

# INCT-A: Institutions

INCT-A is a network of 173 researchers of the following institutions

**Host Institution:**

*Instituto de Astronomia, Geofísica e Ciências Atmosféricas – Universidade de São Paulo*

**Associated Laboratory:**

*Laboratório Nacional de Astrofísica – LNA*

**Associated Universities and Institutes (33):**

1. \*FURG – Fundação Universidade do Rio Grande – RS
2. \*UCS – Universidade de Caxias do Sul - RS
3. \*UDESC – Universidade para o Desenvolvimento do Estado de Sta. Catarina - SC
4. \*UEFS – Universidade Estadual de Feira de Santana - BA
5. \*UEL – Universidade Estadual de Londrina - PR
6. \*UFABC – Universidade Federal do ABC-SP
7. \*UFJF – Universidade Federal de Juiz de Fora-MG
8. \*UFPel – Universidade Federal de Pelotas-RS
9. \*UFS- Universidade Federal de Sergipe - SE
10. \*UFSCar - Universidade Federal de São Carlos – SP
11. \*UFSM – Universidade Federal de Santa Maria-RS
12. \*UNICSUL – Universidade Cruzeiro do Sul - SP
13. \*UNIFEI – Universidade Federal de Itajubá-MG
14. \*UNIFESP - Universidade Federal de São Paulo - SP
15. \*UNIPAMPA – Universidade Federal do Pampa-RS
16. \*UNIVAP- Universidade do Vale do Paraíba - SP
17. \*UNIVASF – Universidade Federal do Vale do São Francisco-PE
18. Centro Brasileiro de Pesquisas Físicas - CBPF
19. CTA/MD – Comando Tecnológico da Aeronáutica – SP
20. Instituto Nacional de Pesquisas Espaciais – INPE
21. Observatório Nacional – ON
22. UESC – Universidade Estadual de Santa Cruz – Ilhéus/BA
23. UFMG – Universidade Federal de Minas Gerais-MG
24. UFRGS – Universidade Federal do Rio Grande do Sul-RS
25. UFRJ – Universidade Federal do Rio de Janeiro-RJ
26. UFSC – Universidade Federal de Santa Catarina-SC
27. UNB – Universidade de Brasília - DF
28. UNESP – Universidade Estadual Júlio de Mesquita Filho-SP
29. Universidade Presbiteriana Mackenzie – SP
30. \*UFSJ – Universidade Federal de São João Del Rey – MG
31. \*UFV – Universidade Federal de Viçosa - MG
32. \*UFPA – Universidade Federal do Pará – PA
33. \*UFRR – Universidade Federal de Roraima - RR

(\*) – Emergent groups



# 1. Results obtained by the INCTA in the period 2009-2015.

We will report here our main results obtained during the last 6 years. It is important to notice that this INCT is quite large (and productive in terms of papers published). Its nature is quite distinct from the vast majority of the others in the sense that it has a strategic approach. We want to address issues that we believe to be essential for the future of Brazilian Astronomy.

## 1.1- Maximizing the return from the Gemini and SOAR telescopes.

### a) *Scientific return*

When the INCTA was proposed, Brazilian astronomy was growing at a rate of ~1% per year. This was a rate much smaller than its previous growth of 11% during the period 1970-2000. The program proposed by INCTA has a very clear strategic nature, to change this rhythm and insert Brazilian Astronomy in the international scene.

The Gemini and SOAR telescopes offer the possibility reach such a goal. After 7 years, it is time to assess the current status. In the following table (Table A) we show the number of papers per telescope in the period 2001-2014.

**Talbe A - Comparative table of papers produced by biennium (2001-2014)**

	<i>Gemini</i>	<i>SOAR</i>	<i>CFHT</i>	<i>OPD</i>	<i>Total</i>
2013+14	44+1*	26+4*	9+1*	27	104+1**+6*
2011+12	32+1*	12+3*	1+2*	31+2*	76+8*
2009+10	29	11+5*	-	29	69+5*
2007+08	23	8+2*	-	27	58+2*
2005+06	14	6+1*		47	67+1*
2003+04	8	0+2*		36+1*	44+3*
2001+02	1			43	44
Até 2000				235	235
Total	150+2*	61+16*	9+3*	473+3*	699+23*

Papers with (\*) are on instrumentation.

Papers with data from more than one telescope have (\*\*).

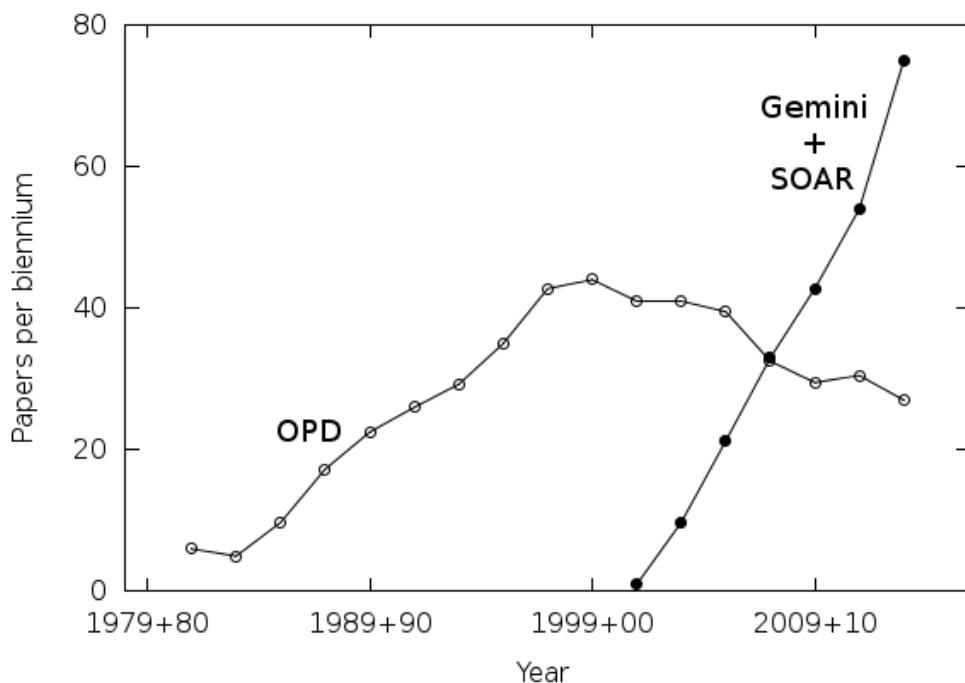


Figure 1. Number of papers per biennium published with data from the telescopes managed by LNA.

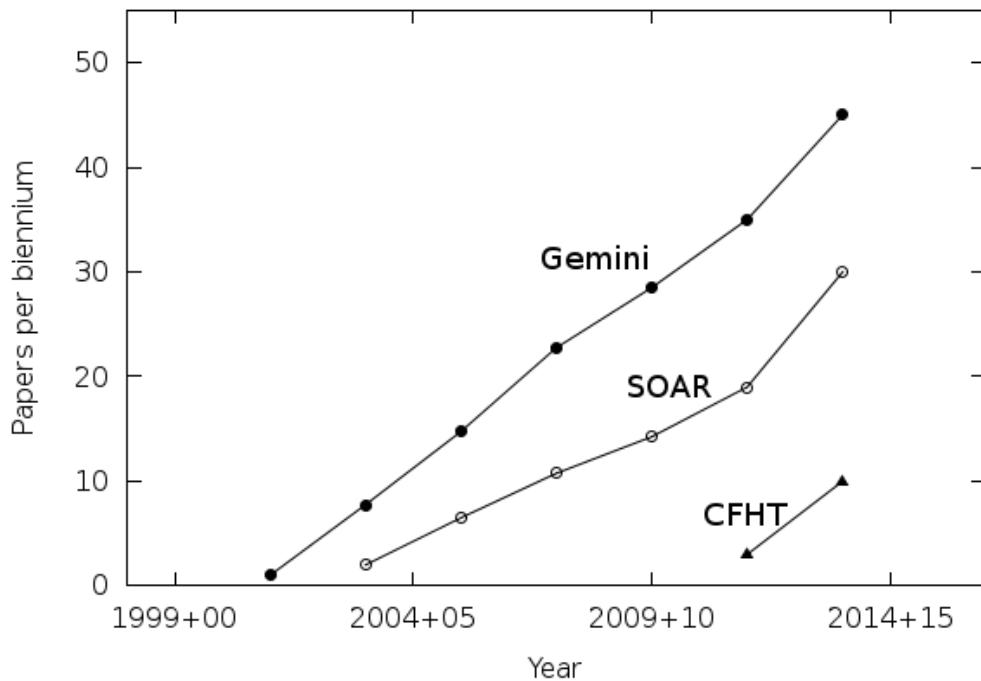


Figure 2. Number of papers per biennium published with data from the telescopes Gemini, SOAR and CFHT by the Brazilian community.

**Table B – Comparative table of brazilian authors vs total of Gemini.**

	<b>2001-10</b>	<b>11+12</b>	<b>2013</b>	<b>2014</b>
Nr <i>papers</i> total Gemini	824	354	202	224
Nr <i>papers</i> w/ brazilian auth.	75	31	17	27
Nr <i>papers</i> w/ 1º aut. brazilian	60	24	11	19
% use of time by Brasil	2.3%	4.6%	5.5%	5.5%
% of <i>papers</i> w/ brazilian auth.	9.1%	8.8%	8.4%	12.1%
% of <i>papers</i> w/ 1º auth. brazilian	7.3%	6.8%	5.4%	8.5%

In recent years, the papers published with Gemini + SOAR data presented a growth rate of 17% per year. This speaks by itself. At the same time Table B shows that the number of papers published by Brazilian astronomers is significantly higher than the average of the partnership. It is clear that the Gemini and SOAR telescopes are showing their scientific production at a progressive pace. The tendency seen in Figure 1 suggest that this will continue.

In recent years Brazilian astronomers have used 5.5% of the telescope time and published 12.1% of the papers. In 8.5% of the total papers published with Gemini data, 8.5% have Brazilians as first author.

*A list of all papers published between 2009 and 2015 by Brazilian authors using data from the SOAR and Gemini telescopes is given in Appendix C. It is important to mention that 100% of these papers were published in journals classified as Qualis A by CAPES.*

### b) Graduate programs

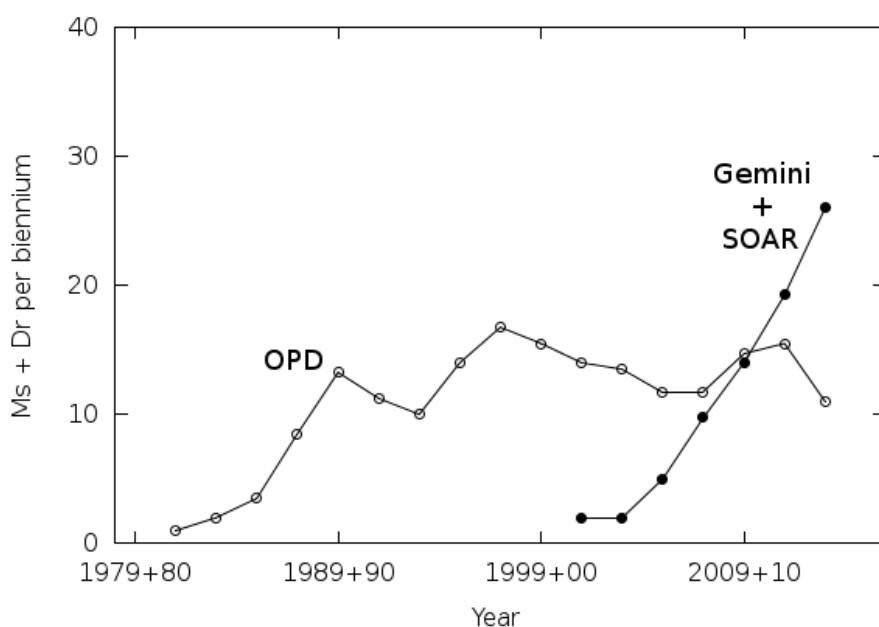
During the 4 years of 2005-08 the number of Master and PhD theses based on data from Gemini+SOAR telescopes was 15. During the 4 subsequent years, 2009-12 this number increased to 32. From 2007+08 to 2011+12 the growth rate was 15% per year. In the biennium of 2013+2014 the number increased to 26; again a significant increase when compared to the previous biennium, as shown in Table A. This shows that in this particular area of astronomy, the growth is quite significant. The contribution of the Gemini and SOAR telescopes is, perhaps, even more convincing here than in the scientific production, as shown n Figure 3.

**Table C - Comparative table of Master and PhD theses, per biennium (2001-2014)**

	<i>Gemini</i>	<i>SOAR</i>	<i>CFHT</i>	<i>OPD</i>	<i>Total</i>
2013+14	15	9+2*	5	11	35+2*+2**
2011+12	9	8+2*	2	17+1*	33+3*+3**
2009+10	5	6+2*	-	15	26+2*
2007+08	10	1	-	11	20+1**
2005+06	4	-		10	14
2003+04	1			16	17
2001+02	2			12	14
Up to 2000				94+3*	94+3*
Total	46	24+6*	7	184+4*	258+10*

Masters in instrumentation are with (\*).

Theses with data from more than one telescope are with (\*\*).



*Figure 3. The number of Ms and PhD theses containing data from telescopes managed by LNA.*

As can be seen in Table D, the number of Master and PhD theses is growing at an increasing pace (currently, about 13% for Masters and 6% for PDs).

*Table D*

	<i>Ms</i>	<i>Dr</i>
2005-2007	89	59
2008-2010	98 (3.3% p/year)	60 (0.6% p/year)
2011-2013	143 (13.4% p/year)	71 (5.8% p/year)

*A list of all Master and Doctorate degrees obtained in Brazil using data from the SOAR and Gemini Telescopes is given in Appendix D.*

*c) Supporting emerging groups*

During the 6 years of INCTA, a total of 21 lap-top and 15 desk-top computers were allocated to the emerging groups. In addition, 2 Virtual Observatory servers where also allocated.

The INCTA provided Astronomy books to 19 institutions with emerging groups.

A great effort in providing fellowships to emerging groups was also made. 49 IC, 7 Ms and 1 Dr fellowships where allocated to them. Perhaps as a consequence, the growth rate of Ms degrees has significantly improved in recent years.

*d) Stimulate the development of instrumentation for the Gemini and SOAR telescopes.*

According to Table C, the first Master Theses in instrumentation for large telescopes started in the period 2009-2012, when a total of 4 theses where obtained.

At the same time, the number of instrumentation papers increased by a large factor, going from 3 in the period of 2005-08 to 13 in the four following years. This corresponds to an increase of 41% per year between 2007+08 and 2011+12.

More importantly, the largest amount of money allocated by INCTA during the last 6 years was to the instrument BTFI (Brazilian Tunable Filter Imager). This instrument has commissioning on the SOAR telescope and its first images have been obtained (see below). The instrument SIFS (SOAR Integral Filed Spectrograph) was also supported by the INCTA, but at lower level, basically for transportation expenses and commissioning.

The number of Brazilian authors in instrumentation pares is 7 for the Gemini telescope and 43 for the SOAR telescope. This is quite impressive for an area that was much smaller previous to the SOAR telescope instrumentation program.



Figure 4 - The BTFI

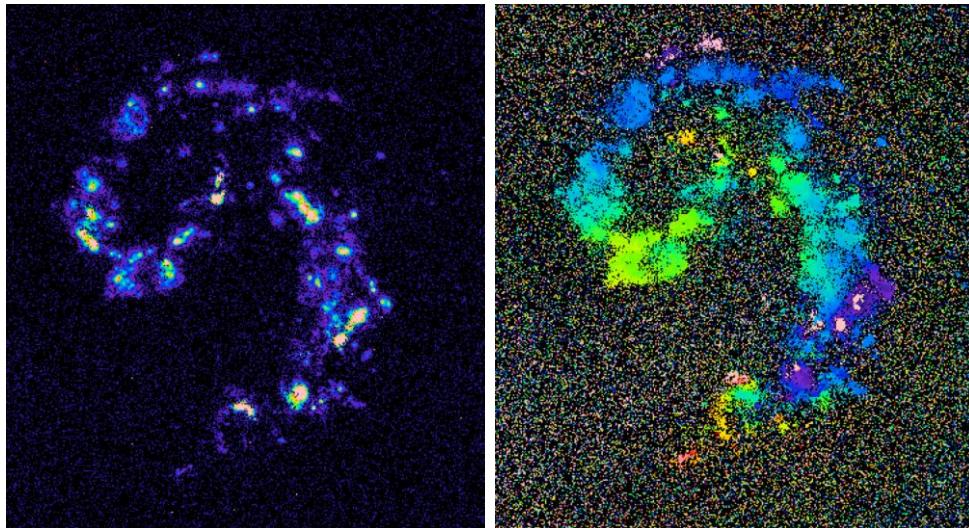


Figure 5 - Images of the the Antenna Galaxy obtained with the Fabry-Perot with the SAM adaptive optics module.

**Table E - Number of Brazilian authors (2001-2012)**

	<i>Gemini</i>	<i>SOAR</i>	<i>CFHT</i>
Nr of Brazilian authors in papers with data	93	65	0
Nr of Brazilian authors in instrum. papers	7	43	1

## 1.2 – Brazilian Astronomy in the era of the LSST and ELT projects.

In the year 2012 (April 1 to 4) an important workshop was held in Campos do Jordão:

## Science with the LSST: a Brazilian/US Joint Workshop

In this meeting both the Brazilian as the US side presented their perspectives and potential use and development for this telescope.

It is important to mention that FAPESP has joined the GMT Consortium as a founding member. It will hold 4% of the observing time.

### 1.3 – Virtual observatories.

a) The year of 2012 was very rich in activities regarding the BRAVO (Brazilian Virtual Observatory) initiative. The following activities and events where held:

- *Primeiro Workshop de e-Science na Astronomia Brasileira*  
09/03/12 – IAG-USP – S. Paulo – SP
- *Bravo Challenge*  
May/12 - October/12
- *Trilha de Astronomia na XXXII Reunião Anual da SBC +SAB*  
  
\* *VO Day in SAB*  
  
\* *Bravo VO School*
- *Interoperability Meeting to IVOA*  
(INCTA+Sociedade Brasileira de Computação)  
July/12 a October/12
- *XXXII Congresso da Sociedade Brasileira de Computação – BRAVO*  
Curitiba

b) Report of the BRAVO activities in the period 2014-2015

During this period, the first dedicated server for the BRAVO was acquired. A software infrastructure was installed with the goal of high offer of services. Currently the first services of *data publishing* in Brazil in conformity to the protocols of the *International Virtual Observatory Alliance* (IVOA; <http://www.ivoa.net>). We plan that this server will be the main data mirror for the S-Plus survey (<http://t80s.iag.usp.br>), by the storage of 32TB of raw data per year; this will also provide services for the user cases from the 2012 INCTA call.

#### Hardware

The *hardware* consists of two high performance storage servers according to the specification bellow:

-2 servers SGI C2112-GP2 of 2U each: 16 Cores Xeon E5-2630v3 2.4-GHz, 20MB cache, 8 GT/s; 128-GB DDR4 1866 MHz; 4 discs 1000-GB SATA2; RAID controller with 512MB of cache supporting RAID 0, 1, 5, 6 e 10 and BBU; 4 gates Gigabit Ethernet;

1 PCI with 2 gates 10GigE SFP+; redundant power supply.

-Storage SGI Infinite 5100 with: disks of 4Us with capacity for 60 HDs;  
Dual RAID controller with 4GB cache; 4 gates SAS 6 Gbit/s; 2 PCI with 2 gates  
SAS; 4 cables SAS 2m; redundant power supply.

-20 disks de 4000-GB SAS 7200 RPM, expandable to 180 HDs;

#### *Software infrastructure*

A *cloud computing* platform was installed for resource management: Open Nebula Sunstone 4.2.10. The *hypervisor* for virtualization is the KVM, and currently there are 2 virtual machines working. One of them hosts the service *gridftp*, protocol that will be used for the transfer of large amount of data. The second virtual machine hosts a server *OwnCloud* (<https://owncloud.org>), for fast data provision for external users.

#### Perspectives

The goal of the server will be used to host data for the Brazilian researchers thru the interoperability protocols defined by IVOA.

The largest of the services, in terms of amount of data, will be the survey S-Plus. For this services we will use the platform that is being developed in the Centro de Estudios de Física del Cosmos de Aragón (ceFca, Teruel, Espanha) for publishing the survey of J-Plus e J-PAS. As a general VO service platform, the system annalist Carlos Paladini of the Department of Astronomy is studying the toolkit OpenCADC, developed by the Canadian Astronomy Data Centre (CADC, <http://www.cadc-ccda.hia-iha.nrc-cnrc.gc.ca/en/>). As soon an adequate knowledge of this tool is available, we intend to call interested users for testing the services. The first *cases* that will be assisted in this first step are:

-A Database for the SOUTH POL Survey (P.I.: Antônio Mário Magalhães (IAG/USP) co-Is: Edgar A. Ramirez (IAG/USP))

-Photometric Redshifts Portal (P.I.: Laerte Sodré Jr. (IAG/USP) co-Is: Walter Santos (UCL, London), Alberto Krone- Martins (SIM/U. Lisboa, BRAVO))

-Grids of Synthetic Spectra (co-Is: Walter Junqueira Maciel, Graziela Roswhita Keller). This was recently submitted to FAPESP as 2 individual proposals (P.I.Paula Coelho e Raul Abramo), for funding 19 new discs of 4TB for storage Infinite 5100, which will increase the storage capacity to 156 TB.

#### **1.4 – New projects of scientific equipment**

Two instruments were supported by INCTA to this point:

1 - The LLAMA radio dish that has the purpose to make interferometry with the ALMA interferometer. In funding stage by FAPESP.

2 – JPAS (Javalambra Physics of Accelerating Universe). This is meant to build and operate a 2.5 m telescope for Cosmology. It is a joint Brazil-Spain consortium to install the telescope in Spain.

3 – T-80 South. A 80 cm wide-field survey telescope installed and operational on CTIO.

4 – The GMT telescope also had some initial travel funding provided by the INCTA. Currently it is funded by FAPESP.

### **1.5 – Education activities: EAD – Science teachers training program**

This is a distance learning course for fundamental and secondary level science teachers in public schools.

After 2 years of development, the first course for science teachers was held in 2011. The course lasted 18 weeks and the conclusion was that it should take longer.

We now offer 2 consecutive courses: one on Solar System at the level of “Atualização” and a second that includes both Solar System and Astrophysics at the level of “Aperfeiçoamento”. For each topic the course provides activities supervised by collaborators (PhD students or post-docs). Each participant is evaluated both by oral and written form. The written evaluation is done in meetings when the participants are physically present.

Content:

#### **Solar System:**

- The Earth-Moon-Sun dynamics
- Position Astronomy
- Characteristics and methods of investigation of astronomical objects in the Solar System

#### **Astrophysics:**

- Stars and stellar evolution
- Galaxies
- Cosmology
- Astrobiology

The number of teachers approved, per year since 2011 is given in Table F. The names of the approved teachers are given in Appendix B.

**Table F - “CURSO DE ASTRONOMIA PARA DOCÊNCIA”**

ANO	REALIZAÇÃO	APOIO	MATR.	APROVADOS	TIPO DE CURSO
2011	EACH	INCTA	100	43	APERFEIÇOAMENTO
2012	EACH	INCTA	164	46	APERFEIÇOAMENTO
2013	EACH / IAG	INCTA	272	35	APERFEIÇOAMENTO
2014	IAG / IF	INCTA	80	15 – SISTEMA	ATUALIZAÇÃO

(*)		/ IAG	----- 50	SOLAR ----- 24-ASTROFÍSICA	APERFEIÇOAMENTO
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(\*) From 2014 on, the course was given in two parts::

Sistema Solar – 130 horas / Atualização

Astrofísica – 240 horas / Aperfeiçoamento

## 2. General production of papers by INCTA members

The total number of papers published by the INCTA members in international refereed papers during the period 2009-14 was 1070. Of these papers, 84% were published in journals classified as Qualis A by CAPES. The number of papers published by journal per year is given in Appendix A. The list of papers published by Brazilian authors containing data from the SOAR and Gemini telescopes is given in Appendix C.

*Table G - Papers published in refereed journals by the researchers*

<i>Year</i>	<i>Total papers</i>	<i>Qualis A</i>	<i>Qualis B</i>	<i>Others</i>
2009	148	83%	11%	6%
2010	177	78%	12%	10%
2011	185	86%	5%	9%
2012	174	83%	2%	15%
2013	185	86%	6%	8%
2014	201	88%	4%	7%
2015	178	89%	3%	8%
<i>Total</i>	1248	85%	6%	9%

### 3. Investments made in the period 2009-2015

Acquisition of computer facilities for emerging groups (2009-2015)

- **21 Lap-top computers:**

1. Alexandre Soares de Oliveira (UNIVAP) Cássio Barbosa (UNIVAP)
2. Fabrício Ferrari (UNIPAMPA)
3. Gabriel Hickel (UNIFEI)
4. Hecktor Monteiro (UNIFEI)
5. Lucimara Martins (UNICSUL)
6. Nádia Magalhães (UNIFESP)
7. Paulo Afrânio Lopes (OV-UFRJ)
8. Sergio Pilling (UNIVAP)
9. Wilton Dias (UNIFEI)
10. João Maria Silva (UFCG)
11. Kelly Torres Dozinel (UFSJ)
12. Marcelo Guimarães (UFSJ)
13. Diana Pilling (UNIVAP)
14. Natalia Landin (UFSJ)
15. Carlos Dutra (UNIPAMPA)
16. Rose Clívia Santos – UNIFESP
17. João Vital da Cunha Junior - UFPA
18. Luciano Fraga - LNA
19. Tiago Ribeiro de Souza - UFS
20. Ana Cristina Moreira Machado Zadra Armond – UFSJ
21. Raimundo Lopes – UFS
22. Bernardo Borges – UFSC/Araranguá

- **14 Desk-Top computers:**

1. André Ribeiro (UESC)
2. Antonio Guimarães (UFRJ- Macaé)
3. Diego Falceta-Gonçalves (USP-Leste)
4. Gabriel Hickel (UNIFEI)
5. Gustavo Lanfranchi (UNICSUL) x2
6. Henry Plana (UESC)
7. Irapuan Rodrigues (UNIVAP)
8. Ivan Soares (UNB)
9. Rogemar Riffel (UFSM)
10. Antonio Guimarães (UFRJ – Macaé)
11. Alexandre Zabot (UFSC-Joinville)
12. Rodrigo Fernandes de Lira Holanda – UEPB x2
13. Sergio Scarano Junior - UFS

**Videocon equipment**

Sílvia Lorenz (UFRJ)  
Sergio Scarano Junior- UFS  
SOAR remote observing room (IAG)

**Virtual Observatory servers:**

Paula Coelho (UNICSUL)  
Roberto Cid Fernandes (UFSC)

**SOAR remote observing stations**

Raimundo Lopes (UFS)  
Alexandre S. de Oliveira (UBIVAP)

**No-breaks:**

1. No-break for the IAG cluster Alfa Crucis
2. No-break for EaD

**Astronomical data reduction and analysis office**

Alexandre S. de Oliveira (UNIVAP)  
06 Desktops

**Teaching equipment**

Carlos Dutra – UNIPAMPA:  
01 Newtonian telescope  
20 binoculars 10x50

Antonio Kanaan Neto – UFSC:  
Optical light modulator

**Acquisition of Astronomy books for emerging groups**

1. 2x UESC
2. FURG
3. UEFS
4. UFABC
5. UFCG
6. UFRJ/Observatório Valongo
7. UFRJ-Macaé
8. UFS
9. UFSC
10. UFSC - Joinville
11. UFSJ
12. UFSM
13. UFV
14. UNICSUL 2x
15. UNIFEI
16. UNIFESP
17. UNIPAMPA
18. UNIVAP 2x

## 19. UNIVASF

### Acquisition of computer facilities for community use

*High Performance GPU processor*

Alex Carciofi (IAG-USP)

This equipment, running at 2.3 teraflops, has been installed at IAG-USP for community use.

*Desk-top computer were allocated to people working for the INCT-A*

Carlos Paladini (IAG-USP)

Anne Louise Scarinci (IAG-USP)

Maria Teresa Lopes (IAG-USP)

*The super cluster Alfa Crucis installed at IAG-USP was opened to all INCTA members with the investment made by INCTA.*

### International Travel (2009-2011)

- Visit to ALMA (Chile)
- Visit to TMT and GMT (Pasadena CA-USA)
- PFS (Los Angeles – USA)
- J-PAS (Teruel - Spain)
- SPIE Astronomical Telescopes and Instrumentation (San Diego-USA)
- Asymmetric Planetary Nebulae V (UK)-Denise Gonçalves
- Virtual Observatory (Munich - Germany)
- Virtual Observatory (Victoria - Canada)
- Gemini users training (Tucson – USA)
- Visit to SPARTAN (Chile)
- Observation mission to IRTF (Hawaii)
- Virtual observatory (Naples - Italy)
- Workshop Astro-informatics 2011 - Sorrente, Itália
- Visit to the Open University (EaD) Milton Keynes, England
- Meeting with LSST – Tucson AZ USA
- Meeting with CFHT – Hawai USA
- J-PAS meeting – Teruel, Spain
- 15 trips to La Serena for the Comissioning of the SOAR instruments SIFS and BTFI

### International Travel (2012)

*BTFI Comissioning - TOTAL: 14 trips*

Janeiro: Henri Plana, Fabricio Ferrari e Renato Severo

Maio: Denis Andrade

Julho: Alvaro, Denis Andrade, Bruno Quint, Claudia Oliveira e Keith Taylor

Setembro: Denis Andrade

Novembro: Denis Andrade, Álvaro Calasans e Claudia Oliveira

Janeiro/2013: Bruno Quint

### SIFS Comissioning – TOTAL: 6 trips

Maio: Orlando Verducci e Flavio Ribeiro (La Serena)

Julho: Orlando Verducci (La Serena)

Janeiro/2013: Rodrigo Vilaça, Ligia Oliveira e João Batista Oliveira (treinamento nos EUA)

### BraVO

Maio: Alex Carciofi e Paula Coelho (IVOA interoperability meeting 2012, University of Illinois)

### Other trips:

Fevereiro: André Amorim, Antonio Kanaan, Fabricio Ferrari e Henrique Xavier – (Reunião J-PAS em Madrid)

Maio: Vinicius Placco (Colaboração científica com a profa. Anna Frebel no MIT (Massachusetts Institute of Technology))

Junho: Anne Scarinci (participação no The World Conference on Physics Education, Istanbul)

Julho: Denise Gonçalves, Eduardo Telles, Rogemar Riffel, Rogerio Riffel, Astor Schonell e Marlon Diniz (participação no Gemini Science Meeting, San Francisco)

Agosto: Bruno Castilho (The 2012 LSST All Hands Meeting, Tucson)

Dezembro: Marcos Lima – (reunião científica do Dark Energy Survey (DES), Texas A&M University)

### International travel (2013-2014)

- Bruno Vaz Castilho de Souza

Período: 25 a 31/03/2013

Participação no workshop "The Next Generation of the CFHT: A wide field spectroscopic facility for the coming decade"

- Henri Michel Pierre Plana

Período: 10 a 18/ 05 / 2013

Science with SITELLE, Quebec / Canadá

- Lucimara Pires Martins

Período: 19 a 27/05/13

Observação no Telescópio APO - Procurando pelas estrelas pós-AGB ionizantes - Apache Point Telescope, New Mexico, EUA

- Karín Delmestre

Período: 10 a 14/06/2013

"A Panchromatic View of Galaxy Evolution 30 Years after the Infrared Astronomical Satellite (IRAS)", Paphos, Cyprus.

- Raimundo Lopes de Oliveira Filho

Período: 15 a 20/06/2014

Participação no evento The X-ray Universe 2014, Dublin, Irlanda

- Treinamento nos Observatórios Gemini e SOAR

Período: 18 a 26/09/2013

Camila Maria Sitko Meira dos Santos

Ingrid Domingos Pelisoli

Henrique Marques Reggiani

André Sampaio

- Marcelo Medeiros Guimarães

Período: 24/12/2013 a 04/01/2014

Observação no Telescópio SOAR

- Hugo Vicente Capelato

Período: 11 a 18/01/2014

Participação no evento “The evolution of galaxy clusters and cluster galaxies in the epoch of large optical/IR surveys” - Sexten/Itália

- Paula Rodrigues Teixeira Coelho

Período: 03 a 10/10/2014

Colaboração com Dr. Stephane Charlot do Institut d’Astrophysique de Paris (auxílio parcial)

- Paula Rodrigues Teixeira Coelho

Período: 17 a 21/11/2014

Participação no evento “Third Workshop on Numerical and Observational Astrophysics: Linking the Local Universe to the Early One”, Buenos Aires

- Alex Cavalieri Carciofi

Período: 30/11 a 05/12/2014

Simpósio 305 da IAU Polarimetry: From the Sun to Stars and Stellar Environments”, Costa Rica

Foreign visitors:

- Christine Jones Forman (Harvard-Smithsonian Center for Astrophysics)

Período: 27/08 a 06/09/2014

colaboração científica entre UFRJ e Harvard-Smithsonian Center for Astrophysics, palestras na UFRJ e no XXXVIII Reunião anual da SAB

- Roland Christian Francis Triay (Aix Marseille Université)

Período: 17 a 22 / 02 / 2013

Participação no evento Verão Quântico 2013

- Charles David Fisher (California Institute of Technology)

- David Frederick Braun (California Institute of Technology)

Período: 11 a 17/ 08 / 2013

Treinamento de eletrônica e micromecânica de precisão para o Laboratório Nacional de Astrofísica - California Institute of Technology

SIFS

Chicago: 04

La Serena: 3

Montréal: 3

BTFI: 19 (La Serena)

GMTO: 04 (Pasadena and Texas)

BRAVO: 04

JPAS: 04 (Spain)

### **International travel (2015)**

GMT meeting in Boston/USA – GCLEF - 20/2/2015

Bruno Castilho, Keith Taylor, Claudia Mendes de Oliveira and Fernando Santoro

BTFI: La Serena 6

SIFS: La Serena 1

GMT Board Meeting 02-05/02/2015

J. Steiner – Sydney Australia

### **Support to Instrumentation (2009-2015)**

- SIFS – SOAR Integral Field Spectrograph
- BTFI –Brazilian Tunable Filter Interferometer
- STELES – SOAR Telescope Echelle Spectrograph
- LLAMA- Latin-American Astronomical Millimetric Array
- JPAS –Javalambra Physics of the Accelerating Universe
- SPARC4 - A simultaneous polarimeter and rapid camera in 4 bands

### **Events held in 2009 - 2011**

*Space Astronomy in Brazil*

IAG-USP, held in September 2009

INCT-A + INCT INESPAÇO

*Instrumentation*

USP-São Carlos, School on Instrumentation for Astronomy and Organic Electronics held in September 2010.

INCT-A + INCT Organic Electronics

*The ASTER project*

Sao Jose dos Campos, 27/10/2010  
INPE+INCT-A

*Verão Quântico 2011*

Anchieta ES 20 a 25/2/2011  
CAPES+CNPq+INCTA

*First International Symposium on Science with the SOAR Telescope*

Maresias, SP – 13-19/05/11  
INCTA+LNA

*I Workshop de Computação Científica em Astronomia*

UNICSUL 02-05/06/11  
INCTA

*Workshop LLAMA*

FAPESP – 8 e 9/08/11  
INCTA

*South American Gemini Data Workshop*

S. Jose dos Campos, 27-30/10/2011

## Events held in 2012

*Primeiro Workshop de e-Science na Astronomia Brasileira*  
09/03/12 – IAG-USP – S. Paulo - SP  
INCTA

*Science with the LSST: a Brazilian/US Joint Workshop*  
Campos do Jordão 01 a 04/04/2012  
INCTA+LNA

*Bravo Challenge*

May/12 - October/12  
INCTA

*Trilha de Astronomia na XXXII Reunião Anual da SBC +SAB*

\* *VO Day in SAB*

\* *Bravo VO School*

\* *Interoperability Meeting to IVOA*  
(INCTA+Sociedade Brasileira de Computação)  
July/12 a October/12

*Reunião do J-PAS*

São Paulo

*XV Curso de introdução à Astronomia e Astrofísica*  
INPE

*XXXII Congresso da Sociedade Brasileira de Computação – BRAVO*  
Curitiba

*III International Conference on Quantum Theories and Renormalization Group in Gravity and Cosmology*  
Grupos Emergentes (UFJF)

*Conference: Galactic Nuclei and Their Connection With Stars and the Environment*  
UFRGS – Gramado

### Events held in 2013

- 17 a 22/02/2013  
*5º Verão Quântico*  
Local: Anchieta / ES

- 26 a 28/04/2013  
*Treinamento para observações remotas no Telescópio SOAR*  
Local: São José dos Campos / SP

- 27 a 28/05/2013  
*BTFI meeting*  
Local: São Paulo

- 15 a 19/07/2013  
*XVI Curso de introdução à Astronomia e Astrofísica*  
Local: São José dos Campos / SP

- 13 a 14/11/2013  
*GMT Science Workshop*  
Local: São Paulo

- 25 a 30/11/2013  
*XIV Latin American Regional IAU Meeting*  
Local: Florianopolis / SC

### Events held in 2014

- 03 a 06/06/2014  
*II Workshop de Computação Científica em Astronomia*  
Local: São Paulo / SP

- 30/06 a 04/07/2014

*XVII Curso de introdução à Astronomia e Astrofísica*

Local: São José dos Campos / SP

- 07 a 09/08/2014

*Rompendo a barreira do desconhecido – Como aproveitar os novos instrumentos do Gemini e do SOAR*

Local: Guarujá / SP

### Events held in 2015

*J-PAS meeting*

Paraty 23-24/2/2015

Coordinators: Raul Abramo and Eduardo Cypriano

*XVIII Curso de introdução à Astronomia e Astrofísica*

Local: São José dos Campos / SP

20-25/07/2015

Coordinator: Claudia Villegas

*The T80 Telescope*

IAG-USP

27/28-8-2015

Coordinator: Claudia Mendes de Oliveira

*Stellar Population Newton Meeting*

IAG-USP

29-30/11/2015

Coordinator: Beatriz Barbuy

*XVII Advanced School in Astrophysics*

Local: Campos do Jordão

22-26/11/2015

Coordinator: Joao Steiner

### FELLOWSHIPS ALLOCATED BY THE INCT-A

Categoria Iniciação Científica			
Bolsistas (Ordem alfabética)	Instituição	Título do trabalho	Vigência
Adam Smith Gontijo Brito de Assis (Orientador: Ivan Soares Ferreira)	UNB	Análise estatística de catálogos de galáxias	01/09/2010 a 31/08/2012
Agatha Harumi Alves da Costa (Orientadora: Rose Clivia Santos)	UNIFESP	Teste da Idade do Universo	01/04/2011 a 29/02/2012
Alexandre Campos Vergueiro Monteiro de Almeida (Orientador: Caius Selhorst)	UNIVAP	Estudo das variações do raio solar em 17 e 34 GHz	01/05/2012 a 30/04/2014

Aline Tendolini (Orientadora: Adriana Valio)	Mackenzie	Determinação da Opacidade Atmosférica em 45 Ghz E 90 Ghz No Casleo	01/08/2014 a 31/12/2014
Anderson Seiji Okada (Orientadora: Nadja Magalhães)	UNIFESP	Astrofísica De Pulsares: O Problema Do Decaimento Do Período Orbital	01/09/2010 a 31/08/2011
Andrea Elisabete de Paula (Orientador: Odilon Giovannini)	UCS	Observatório Astronômico Itinerante (OAI)	01/10/2012 a 30/09/2013
Andressa Rossini Goulart (Orientador: Carlos Dutra)	UNIPAMPA	Dialmaker: um aplicativo gratuito para construir um relógio de sol."	01/07/2013 a 30/06/2014
Ariana Franca Clavia (Orientador: Luiz Paulo Vaz)	UFMG	Aglomerados binários da pequena nuvem de Magalhães	01/05/2012 a 31/12/2012
Arthur Eduardo da Mota Loureiro (Orientador: Horacio Dottori)	UFRGS	Simulações Computacionais de N- Corpos para Sistemas com Buracos Negros	01/04/2011 a 31/10/2011
Caio Cezar Gomes Laranjo (Orientador: Alexandre Oliveira)	UNIVAP	Variações cíclicas nos períodos orbitais de estrelas variáveis cataclísmicas	01/10/2012 a 30/09/2013
Caio Rodrigues dos Santos (Orientador: Valerio Carruba)	UNESP	Dynamical evolution and chronology of the Hygiea asteroid family	01/05/2013 A 30/04/2014
Calliu Ícaro da Silva Soares Rosa (Orientador: Militão Vieira Figueroedo)	UNIVASF	Detalhamento mecânico do heliostato e dimensionamento dos sistemas sem fim e coroa	01/04/2011 a 31/03/2012
Carolyne Santos de Oliveira (Orientadora: Karin Delmestre)	Observatório do Valongo	Galáxias luminosas no Ultravioleta:representantes de população no alto redshift	01/05/2012 a 30/04/2013
Cilon Viana Leão (Orientadora: Daniela Pavani)	UFRGS	Aglomerados estelares Galácticos no infravermelho-próximo: contribuição para síntese de população estelar e calibração de modelos evolutivos	01/10/2012 a 30/06/2013
Dalton Dias Meira (Orientador: Francisco Carlos Rocha Fernandes)	UNIVAP	Análise De Dados De Rádio-Emissões Solares Aplicando Técnicas De "Wavelet"	01/08/2011 a 30/09/2011
Davi Rohe Salomon da Rosa Rodrigues (Orientador: Daniel Müller )	UNB	Termodinâmica de Buracos Negros	01/11/2009 a 31/07/2010
Dino Beghetto Junior (Orientador: Irapuan Rodrigues Oliveira Filho)	UNIVAP	Dinâmica de galáxias:simulações numéricas de N-Corpos	01/09/2010 a 30/11/2010
Eduardo Lourenço Andrade (Orientador: Raymundo Baptista)	UFSC	Espectroscopia de uma erupção da nova anã V2051 OPHIUCHI: Analisoando A Linha Espectral H $\beta$ Resolvida Em Velocidade   V   = 400- 1000 Km/S	01/08/2012 a 31/07/2013
Eduardo Luann Wojcikiewicz Duarte Silva (Orientador: Raymundo Baptista)	UFSC	A distância até V2051 Ophiuchi: testando os modelos para erupção em novas anãs	01/05/2013 a 30/04/2014
Elizabete Guitzel (Orientadora: Nadja Magalhães)	UNIFESP	Estudo Da Modelagem De Curvas De Rotação De Galáxias	01/08/2011 a 31/07/2012

Elvis William Carvalho Cantelli (Orientadora: Beatriz Barbuy)	IAG	Espectroscopia De Alta Resolução De Estrelas Pobres Em Metais: Ngc 6522 – Aglomerado Globular Pobre Em Metais Do Bojo Galáctico	01/08/2012 a 31/07/2013
Fabiana Lima Costa (Orientador: Gabriel Hickel)	UNIFEI	Procura por Estrelas Variáveis nos Aglomerados Estelares Abertos NGC6216 e NGC6583	01/06/2014 a 31/05/2015
Fabio Pinto Rodrigues (Orientador: Alberto Ardila)	LNA	As Linhas Coronais Como Suporte Observacional De Processos De Feedback Em Agns	01/09/2012 a 31/08/2013
Felipe de Paula Lima (Orientador: Ivan Soares Ferreira)	UNB	Análise estatística de catálogos de galáxias	01/09/2010 a 31/08/2011
Felix Silva de Lima (Orientador: Rodrigo Holanda)	UEPB	Previsões sobre limites na validade da relação de dualidade cósmica usando simulações Monte Carlo	01/06/2015 a 31/05/2015
Filipe Fontanella (Orientador: Raymundo Baptista)	UFSC	Aquarii em um estado anômalo de brilho Espectrofotometria GOODMAN/SOAR de UU	01/08/2011 a 31/12/2011
Francisco Elânio Bezerra (Orientador: Gustavo Lanfranchi)	UNICSUL	Formação e evolução de galáxias :as galáxias irregulares anãs Sextan A e Sextan B	01/09/2010 a 31/08/2011
Frederico Guilherme de Oliveira (Orientador: Sergio Pilling)	UNIVAP	A Química do Fósforo Interestelar	01/05/2012 a 30/11/2012
Frederico Vilela de Lima (Orientador: Anderson Caproni)	UNICSUL	Estudo Da Cinemática Do Jato Do Quasar 3c 345 Em Escala De Parsec	01/09/2010 a 31/08/2011
Gabriel Martins Palma Perez (Orientador: Jorge Melendez)	IAG	Potencializando O Uso Do Steles No Soar: Lista De Estrelas Candidatas Para Estudos De Exoplanetas, Evolução Estelar, Estrutura Galáctica, Populações Estelares E Cosmologia	01/05/2012 a 30/04/2013
Gabriela Augusta Prando (Orientador: Gustavo Rojas)	UFSCAR	Parâmetros estelares de estrelas com exoplanetas	01/04/2011 a 28/02/2013
Giovane Galdino da Silva (Orientador: Caius Selhorst)	UNIVAP	Análise observacional das mudanças nos campos magnéticos de regiões ativas	01/10/2012 a 30/09/2013
Graciana Brum João (Orientador: Fabricio Ferrari)	FURG	Dinâmica de Galáxias: Sistemas Estelares Esferoidais	01/04/2011 a 31/03/2012
Guilherme Muller Peccini (Orientador: Horacio Dottori)	UFRGS	Estudo Da Região Central De Ngc 5128: Análise De Observações Espectroscópicas Realizadas Com Flamingo 2 Na Banda K	01/06/2012 a 31/05/2013
Helder José Farias Lima (Orientador: Alexandre Soares de Oliveira)	UNIVAP	Estudo Fotométrico de Candidatas a Progenitoras de Supernovas do Tipo IA	01/05/2010 a 31/07/2010
Isabel de Jesus Lima (Orientador: Eduardo Amores)	UEFS	Identificação de galáxias no grande levantamento VVV	01/05/2013 A 30/04/2014
Jamille Almeida Feitosa (Orientadora: Maria Jaqueline Vasconcelos )	UESC	Análise Espectroscópica Do Jato Hh111 A Partir De Dados Gmos-Ifu	01/10/2009 a 31/07/2012

Jessica Caroline dos Santos Simplicio (Orientador: Jorge Melendez)	IAG/USP	Rotação, Atividade Estelar E A Procura De Outras Terras	01/11/2012 a 31/10/2013
João Vitor Frossard (Orientador: Ilya Shapiro)	UFJF	Estudo Do Formalismo Tensorial Para Aplicações Em Física Teórica	01/08/2012 a 31/07/2013
José Declerk Buaca Sinadinse (Orientador: Francisco Fernandes)	UNIVAP	Identificação, Catalogação E Análise Preliminar De Dados De Rádio-Emissões Solares Em Ondas Métricas Registradas Pelo Callisto-Br	01/05/2012 a 30/04/2013
Leonardo Augusto Gonçalves dos Santos (Hektor Monteiro)	UNIFEI	Determinação De Características De Estrelas Progenitoras De Nebulosas Planetárias Com Modelos De Evolução Estelar: O Caso De Ngc 40	01/10/2012 A 31/07/2013
Leonardo de Albernaz Ferreira (Fabricio Ferrari)	FURG	Estabilidade das medições de parâmetros morfológicos com o Redshift	01/10/2012 a 30/09/2013
Levy Scalise Maciel (Orientadora: Tatiana Michtchenko)	IAG	Uso do Mathematica no estudo de dinâmica planetária	01/05/2012 a 30/04/2013
Luana Souza Borges (Orientador: Sergio Pilling)	UNIVAP	Processamento por radiação VUV e raios-X de gelos astrofísicos contendo ácido fórmico: relevância para nuvens moleculares	01/09/2014 a 30/04/2015
Lucas Gustavo Gonçalves Pimenta (Orientador: Eduardo Cypriano)	IAG	Detecção de Estruturas em Dados Fotométricos de Galáxias	01/02/2013 a 31/01/2014
Luenne Nailam Sousa Nascimento (Orientador: André Ribeiro)	UESC	Um Módulo Para Monitoramento De Extinção Atmosférica Usando Chimera	01/05/2012 a 30/04/2013
Luis Fernando Basso (Orientador: Odilon Giovannini)	UCS	Observatório Astronômico Itinerante (OAI)	01/06/2012 a 31/08/2012
Luiz Filipe Hermes Calvi (Orientador: Antonio Guimarães)	UFRJ-Macaé	Imageamento e Análise de Mapas Bidimensionais	01/08/2012 a 31/07/2013
Marcos Felipe Faria Terra Siqueira (Orientador: Gabriel Hickel)	UNIFEI	Fotometria de exoplanetas tipo hot-Jupiters em sistemas planetários com trânsito	01/05/2013 a 30/04/2014
Marcus Vinicius Araujo Moreno (Orientador: Antonio Guimarães)	UFRJ-Macaé	Simulação de Dados de Supernovas tipo Ia	01/08/2012 a 31/07/2013
Mariana Arantes Mazzi (Orientador: Augusto Damelin)	IAG	Distâncias de aglomerados galácticos massivos através de binárias eclipsantes	01/05/2012 a 30/04/2013
Natasha Fioretto Aguero (Orientadora: Tatiana Michtchenko)	IAG	Sistemas Planetários Extra-Solares: métodos de detecção e dinâmica	01/05/2013 A 30/04/2014
Nyergirton Barreiros dos Santos Costa (Orientador: Militão Figueiredo)	UNIVASF	Controle de um heliostato através de microcontrolador	01/05/2012 a 30/04/2013
Otavio Migliavacca Madalosso (Orientador: Haroldo Campos)	INPE	Algoritmo Fof (Friends-Of-Friends) Para Classificação De Objetos Astronômicos Versão N*Log(N), Com Implementação Em Openmp E Openacc	01/05/2012 a 30/04/2014

Pablo Chagas Oliveira (Orientadora: Thaisa Bergmann)	UFRGS	População Estelar no Disco Nuclear de Galáxias não Ativas	01/05/2012 a 30/04/2013
Pedro Antonio Batista Brito (Orientador: Henri Plana)	UESC	Taxa de Formação Estelar em Grupos Compactos de Hickson	01/08/2013 A 30/06/2014
Pedro Papini de Araujo (Orientador: Eduardo Bica)	UFRGS	Determinação da Natureza de Possíveis Aglomerados de Estrelas Jovens	01/05/2013 A 30/04/2014
Pietro Soares Ramalho (Orientadora: Rose Clivia Santos)	UNIFESP	Energia Escura, Diâmetro Angular e Distância de Dyer-Roeder	01/05/2013 A 30/04/2014
Rafael Luiz Bernardi (Abilio Mateus Junior)	UFSC	Leis De Extinção Interestelar E A Análise De Resultados Do Starlight	01/08/2011 a 31/12/2011
Rafael Pantaleão Moreira (Orientador: Oli Luiz Dors Junior)	UNIVAP	Influência de Parâmetros Nebulares e Estelares sobre Estimativas de Taxa de Formação Estelar	01/04/2011 a 30/04/2013
Raianni Oliveira Fernandes (Orientadora: Diana Oliveira)	UNIVAP	Metanol no Sistema Solar e no meio interestelar	01/01/2013 a 31/12/2013
Renato da Silva Severo (Orientador: Fabricio Ferrari )	UNIPAMPA	Visualizador de Cubo de Dados: lionFits	01/10/2009 a 30/09/2010
Renato Mello da Silva Farias (Orientador: Wagner Marcolino)	Observatório do Valongo	Ventos Estelares	01/05/2012 a 31/05/2013
Rodrigo Voivodic (Orientador: Laerte Sodré)	IAG	A função de massa dos aglomerados de galáxias	01/05/2012 a 30/04/2013
Sarah Letícia Veneziani Kamezawa (Orientador: Francisco Fernandes)	UNIVAP	Determinação Das Características Espectrotemporais De Radioemissões Solares Métricas Tipo Iii E Sua Associação Com Flares Em Raios-X	01/11/2012 a 30/04/2013
Sergio Henrique Mateus Douwens dos Santos (Orientador: Valerio Carruba)	UNESP	Mobilidade asteroidal induzida por encontros próximos com asteroides massivos	01/08/2011 a 31/08/2012
Simpliciano Castardelli dos Reis (Orientador: Ilya Shapiro)	UFJF	Um Estudo do Tensor de Curvatura no Âmbito da Relatividade Geral e as Equações de Einstein e suas Consequências	01/08/2012 a 31/07/2012
Thais de Oliveira da Conceição (Orientador: Oli Dors)	UNIVAP	Abundância química em anéis de formação estelar circumnucleares	01/05/2012 a 30/04/2014
Thiago Marcel de Almeida Santana (Orientador: Iranderly Fernandes)	UEFS	Estudo Espectroscópio de Galáxias Wolf-Rayet Empregando Ferramentas do Observatório Virtual	01/04/2011 a 31/03/2012
Wagner Schindlwein (Orientador: Raymundo Baptista)	UFSC	Mapeamento de Flickering e Superhump da binária eclipsante de menor período SDSS J0926+36	01/05/2012 a 31/05/2013
Walter Silva Martins Filho (Orientador: Thais Mothé Diniz)	Observatório do Valongo	Efeito Yarkovsky aplicado em famílias de ateróides diferenciados	01/09/2010 a 31/07/2012

	Categoria Pós-Doutorado Junior			
	Bolsistas (Ordem alfabetica)	Instituiçāo	Projeto	Vigēncia
1	Allan Schnorr Muller (Pesquisador responsável: Thaisa S. Bergmann)	UFRGS	Compreendendo a alimentação do buraco negro supermassivo: cinematografia estelar e do gás no kiloparsec central de galáxias ativas	01/07/2013 a 31/07/2013
2	Anne Louise Scarinci Branda (Pesquisador responsável: Diego Falceta Gonçalves)	IAG	O ensino e a aprendizagem em um curso de astronomia para docentes a distância	01/09/2010 a 31/07/2012
3	Cintia Quireza Campos (Pesquisador responsável: Denise Rocha Gonçalves)	OV	Nebulosas planetárias Espacialmente resolvidas e seu papel na Evolução de galáxias próximas	01/11/2009 a 31/10/2011
4	Daniela Borges Pavani (Pesquisador responsável: Eduardo Bica )	UFRGS	Estudo de Aglomerados Abertos Galácticos com o 2MASS: 1. Análise de Aglomerados Abertos Remanescentes 2. Obtenção de parâmetros físicos para aglomerados abertos por modelamento de cmds	01/10/2009 a 31/08/2010
5	Denilso da Silva Camargo (Pesquisador responsável: Charles Bonatto)	UFRGS	Aspectos da evolução de aglomerados estelares	01/05/2012 a 28/02/2013
6	Dinah Moreira Allen (Pesquisador responsável: Diego Gonçalves)	EACH	Avaliação do aprendizado em um curso de Aperfeiçoamento em astronomia para docentes Do ensino básico	01/03/2012 a 28/02/2013
7	Fabíola Campos (Orientador: Kepler Oliveira Filho)	UFRGS	Parâmetros astrofísicos de Aglomerados Globulares	01/08/2013 a 31/10/2013
8	Francisco Ferreira de Souza Maia (Pesquisador responsável: João Francisco C. Santos Jr.)	UFMG	Parâmetros astrofísicos de aglomerados das Nuvens de Magalhães: buscando uma melhor compreensão da estrutura e evolução destas galáxias	01/04/2012 a 31/03/2012
9	Iranderly Fernandes de Fernandes	LNA	Projeto SOAR-VO	01/08/2009 a 30/06/2010
10	Marcos Vinicius Borges Teixeira Lima (Pesquisador responsável: Laerte Sodré)	IAG	Teorias De Gravidade Modificada E Aplicações De Lentes Gravitacionais	01/09/2010 a 30/09/2010
11	Marina Trevisan (Pesquisador responsável: Reinaldo R.R. Carvalho)	INPE	Bárions em halos de matéria escura: conteúdo e história de formação estelar de galáxias elípticas	01/04/2012 a 31/07/2012
12	Natalia Vale Asari (Pesquisador responsável: Roberto Cid Fernandes Junior)	UFSC	O Novo Observatório Virtual do Starlight: Preparação para uma nova era de dados	01/05/2010 a 30/01/2011
13	Paulo Fernando Penteado (Pesquisador responsável: Claudia Mendes de Oliveira)	IAG	Processamento, catalogação e mineração de imagens astronômicas	01/11/2011 a 30/04/2012

14	Sandro Barbosa Rembold	UFSM	Propriedades Cinemáticas De Galáxias A Alto Redshift Via Espectroscopia Integrada	01/09/2012 a 31/10/12
15	Thiago Signorini Gonçalves (Pesquisador responsável: Paulo Afranio Lopes)	Observatório do Valongo	A formação de galáxias starburst: histórico dos últimos 10 bilhões de anos	01/10/2011 a 30/11/2011
16	Tiago Abreu Saurin (Pesquisador responsável: Eduardo Bica)	UFRGS	Parâmetros e vínculos de aglomerados estelares embebidos	01/06/2012 a 30/09/2012
17	Walter Augusto dos Santos Jr (Pesquisador responsável: Laerte Sodré)	IAG	Busca de Aglomerados em Levantamentos de Galáxias	01/04/2012 a 30/04/2012

**Fellowships: Visiting Fellow (BEV-A)**

Noemi Pinilla-Alonso (Orientadora: Thais Mothé-Diniz/UFRJ)

**Appendix A**  
**SCIENTIFIC PRODUCTION – 2009/2015**

**Table A1 - Distribution of the papers published by the INCT-A researchers in 2009, by journal**

Journal	Qualis	Nr of papers	%
A&A	A2	34	23
MNRAS	A2	35	23
ApJ	A1	27	18
PhRvD	A2	10	7
AJ	A2	10	7
PhRvL	A1	1	1
AstL	s/c	1	1
CoPhC	s/c	1	1
JCAP	A1	5	3
PhLB	A2	3	2
Icarus	B1	2	1
GReGr	B2	1	1
AdSpR	s/c	4	3
APh	B3	1	1
P&SS	s/c	1	1
CeMDA	B4	1	1
ApSS	B4	4	3
RMxAA	B1	1	1
New Astron	B2	2	1
IJMPA	B3	3	2
PASJ	B1	1	1
PASA	s/c	2	2
Ast L	s/c	1	1
PhRvL	A1	1	1
CoPhC	s/c	1	1

**Total 148 papers:**

**83% Qualis A**

**11% Qualis B**

**6% Others**

**Table A2 - Distribution of the papers published by the INCT-A researchers in 2010, by journal**

Journal	Qualis	Nr of papers	%
A&A	A2	45	25
MNRAS	A2	36	20
ApJ	A1	25	14
PhRvD	A2	13	7
AJ	A2	9	5
JCAP	A1	6	3
Icarus	B1	4	2
IJMPA	B3	8	4
AdSpR	s/c	6	3
APh	B3	2	1
ApSS	B4	5	3
RMxAA	B1	2	1
New Astron	B2	1	1
Nature	A1	1	1
PhLB	A2	2	1
PhRvC	A2	1	
JphCS		2	
IJT		1	
EL		1	
Cos Re		1	
SoPh		1	
JGRE		1	
CQGra		1	
AdAst		1	
AN		1	

**Total: 177 papers**

**78% Qualis A**

**12% Qualis B**

**10% Others**

**Table A3 - Distribution of the papers published by the INCT-A researchers in 2011, by journal**

Journal	Qualis	Nr of papers	%
A&A	A2	40	22
MNRAS	A2	58	31
ApJ	A1	40	22
PhRvD	A2	6	3
AJ	A2	11	6
Icarus	B1	2	1
IJMPS	B3	4	2
ApSS	B4	2	1
RMxAA	B1	2	1
Nature	A1	2	
PhLB	A2	1	
PASP	A2	2	
CQGra		1	
AdAst		1	
Others		17	

**Total: 185 papers**

**86% Qualis A**

**5% Qualis B**

**9% Others**

**Table A4 - Distribution of the papers published by the INCT-A researchers in 2012, by journal**

Journal	Qualis	Nr of papers	%
A&A	A2	41	24
MNRAS	A2	47	27
ApJ	A1	39	22
PhRvD	A2	4	2
AJ	A2	5	3
JCAP	A1	5	3
Icarus	B1	1	1
IJMPA	B3	1	1
AdSpR	s/c	3	2
ApSS	B4		1
RMxAA	B1		1
New Astron	B2	2	1
Nature	A1	2	1
PASP	A2	1	
PhRvL	A1	1	
JphCS		2	
JGRE		1	
AdAst		1	
Others		12	

**Total: 174 papers**

**83% Qualis A**

**2% Qualis B**

**15% Others**

**Table A5 - Distribution of the papers published by the INCT-A researchers in 2013, by journal**

Journal	Qualis	Nr of papers	%
A&A	A2	48	26
MNRAS	A2	55	30
ApJ	A1	39	21
PhRvD	A2	8	4
AJ	A2	5	3
JCAP	A1	1	1
Icarus	B1	2	1
IJMPA	B3	2	1
AdSpR	s/c	2	1
APh	B3	2	1
ApSS	B4	1	1
RMxAA	B1	3	2
New Astron	B2	2	1
PASP	A2	1	1
PhRvC	A2	1	1
PhRvL	A1	1	1
SoPh		1	1
JGRE			
CQGra		1	
AdAst			
AN		1	
Others		9	

**Total: 185 papers**

**86% Qualis A**

**6% Qualis B**

**8% Others**

**Table A6 - Distribution of the papers published by the INCT-A researchers in 2014, by journal**

Journal	Qualis	Nr of papers	%
A&A	A2	60	30
MNRAS	A2	62	31
ApJ	A1	38	19
PhRvD	A2	6	3
AJ	A2	6	3
JCAP	A1	3	1
Icarus	B1	-	-
IJMPA	B3	2	1
AdSpR	s/c	-	-
ApSS	B4	4	2
RMxAA	B1	1	-
New Astron	B2	2	1
Nature	A1	1	-
PhRvC	A2	1	-
PhRvL	A1	1	-
SoPh		1	-
JGRE			
CQGra		3	
AdAst		1	
AN		2	
Others		8	

**Total: 201 papers**

**88% Qualis A**

**4% Qualis B**

**7% Others**

**Table A7 - Distribution of the papers published by the INCT-A researchers in 2015, by journal**

Journal	Qualis	Nr of papers	%
A&A	A2	47	26
MNRAS	A2	60	34
ApJ	A1	43	24
AJ	A2	6	3
JCAP	A1	2	2
ApSS	B4	4	2
PASP	A2	1	1
RMxAA	B1	1	-
New Astron		3	2
GQGra		3	2
GReGr		1	-
PhA		1	
SoPh		1	-
JGRE			
CQGra		3	
PASJ		1	
AN		1	
Others		3	

**Total: 178 papers**

**89% Qualis A**

**3% Qualis B**

**8% Others**

## Appendix B - EaD Teachers Approved

### B1– 2011

1. Adriana Hitomi Deguchi
2. Ana Paula Freire da Silva
3. Anderson Ramos da Silva
4. Andre Fernando de Sousa
5. Antonio Beltrame
6. Carlos Alberto de Lima
7. Carlos Richard Eduardo Matheus Lizárraga
8. Denise Assis da Silva
9. Eliane Honório de Oliveira
10. Elton Moraes Barbosa
11. Fábia Almeida Lino
12. Fabiano de Pádua Conceição
13. Fabio Roberto Lessa de Oliveira
14. Fernando Augusto Silva
15. Francimara Nascimento da Silva Marcondes
16. Hildebrando José Balieiro Ramos
17. Janecléia Alves Lourenço
18. João Wesley da Silva Nunes
19. José Manoel Damas Neto
20. Josué Antunes de Macedo
21. Juraci Pereira Sotero – MATO GROSSO
22. Liliane Pimentel da Silva
23. Luana Neri Thomaz da Silva
24. Lyara Araujo Gomes
25. Margarete Agosta de Arruda
26. Maria Helena Pereira
27. Mauricio Galante Muzetti
28. Michele Aparecida Alves Lopes
29. Miriam Milanelo
30. Nathali Ingrid de Castro
31. Nathália Lopes Valderrama
32. Patrícia Petricone Moraes
33. Paulo Alessandro Veloso
34. Regiane Souza Pinto
35. Reinaldo Borges Júnior
36. Renata da Silva Cavalcanti
37. Roberta Miyuki Toledo de Amorim
38. Roberto Galvani Felipe
39. Roger Toledo de Amorim
40. Rogério Carlos dos Santos
41. Sibele Cristine Girotto Maziero
42. Valentina Aparecida Bordignon
43. Vitor Pereira Belotto

**B2 – EaD: Approved – 2012**

1. Álvaro Jean Borges Almeida
2. Ana Lucia Cavalca Fernandes Franco de Oliveira
3. Ana Lucia Protásio de Almeida
4. Antonio Carlos da Silva
5. Aparecida Ramos Fortes Pereira
6. Ariana Souza de Santana
7. Áurea Lucia de Oliveira Dantas Albuquerque
8. Breno Alexandre Dalosto
9. Cely Garcia Fernandes Pereira
10. Clélia Scalon de Medeiros
11. Daniel Atkocius Filho
12. Décio Carlos Namba
13. Douglas Rizzi
14. Enilce Aparecida Junquetti Ferraz da Motta
15. Fernanda Gracielly Moura Alves
16. Fernando Cesar Dalben Posse
17. Francisco Mondillo Neto
18. Genésio Ferreira Parreira
19. Jackeline Suelen do Nascimento
20. Jenifer Garcia
21. José Aparecido Requena
22. Luciene Oliveira de Azevedo do Rosário
23. Lucineide Sales Marciano
24. Magaly Consulino
25. Mara Lúcia Teixeira Rosa
26. Marco Aurelio Correa
27. Mariana Ferreira Campello
28. Marilin Celisa Cannavan
29. Monique Sanfilippo Rojas
30. Nágila Euclides da S. Polido
31. Nanci G. Ribeiro Guimarães – RIO DE JANEIRO
32. Patricia Correa
33. Patricia Takahashi Lopes
34. Pedro Filipini Netto
35. Rafael de Castilho Cezzaretti
36. Raimundo Gomes Soares
37. Renata Correia da Silva
38. Renata Correliano Nardocci
39. Ricardo Kokay Arpiani
40. Robinson Ferreira de Araujo
41. Rosineide Ramos Celestino
42. Sandra Neres da Silva
43. Sara Ferreira Parreira
44. Sergio Chaves Jardim
45. Simone A. Pereira da Silva

46. Tatiane Santos Rosa

**B3 – EaD: Approved – 2013**

1. Andréa Souza Santos
2. Antonia Andréia Alves Costa
3. Audiele Aparecida da Fonseca
4. César Augusto Prieto
5. Claudia Regina Vicente
6. Danilo Oliveira dos Santos
7. Elaine Aparecida Braga
8. Elaine Cristina Felix Vieira
9. Eliude de Lima Angelo
10. Fernanda Freire
11. Francisco Carlos Zanetti
12. Gabriela Francisca de Oliveira Messias
13. Gilmar de Oliveira
14. Heliton Pereira da Silva
15. Ines Regina Vieira
16. Jeane Gonzalez de Oliveira
17. Jorgea Debora Silva
18. José Alexandre
19. Jose Carlos Chiacchio
20. José Wilton dos Santos
21. Joseani Aparecida Coelho das Neves
22. Leandro de Melo Duarte Franco
23. Leonardo Martins Pandori
24. Marco Antonio Spinelli
25. Maria de Lourdes Dantas da Silva Santos
26. Marília Gabriela Ferreira Sinzato
27. Marisa Mattos
28. Michele Pereira Silva
29. Monica Fátima de Mello Lemos Silva
30. Patrícia Gasparini
31. Renan Bastos da Silva
32. Renata Vitoria Dugain
33. Renato Mendes Mineiro
34. Sabrina Tamarozzi
35. Vânia Vieira Ramos

**B4 – EaD: Approved – 2014**

**CURSISTAS APROVADOS DE ASTROFÍSICA**

1. Ana Batista Santos
2. Antonio Cesar Pinheiro
3. Camilla Oliveira dos Santos
4. Celio Ferraz Ribeiro

5. Cleber Ramos Mora
6. Daniel Augusto de Castro Spegiorin
7. Dayvidson Siqueira Eufrásio – MINAS GERAIS
8. Denis Pimentel
9. Edgard Pereira Neves
10. Esther Cambeses Polanco
11. Helder Clementino Lima Silva
12. Hugo Ricardo Conceição Eloy
13. Idelzuite Azevedo Alcântara Leme
14. Jenifer Pereira de Oliveira Pontes
15. José Vilson Bezerra
16. Juliana de Paula Chinellato
17. Kleberson Diego de Castro
18. Luciana Villaça
19. Luciano Octavio Condori Huanca
20. Marcelo Antonio Amorim - PERNAMBUCO
21. Maria das Graças Pereira Condori
22. Miriam de Carvalho
23. Paulo Rogério Borba de Aquino - BAHIA
24. Rafael Assenso
25. Regina Cláudia Pinto de Souza
26. Renata Cristina de Andrade Oliveira
27. Rodrigo Rodrigues Gimenez
28. Stefan Bovolon Feliciano
29. Wilian Stein

### **CURSISTAS APROVADOS DE SISTEMA SOLAR**

1. Alessandra Aparecida Silvano
2. Ana Rita de Jesus de Carvalho
3. André Luis de Carvalho
4. Bruno Lima Emídio
5. Clarissa de Melo Maximo de Lemos
6. Débora Regina Félix Ribeiro Valverde
7. Eliane Mitsue Kikuchi
8. Eloiza Hitomi Wakate Hieda
9. Fernando Luis Leite Carreiro
10. Isabel Aparecida Borota
11. Jairo Martins de França
12. Josemir Inácio de Lemos
13. Renata Rosie Massei Damasceno
14. Rolando Buniy
15. Vera Lúcia Malinauskas

B5 – EaD: Approved – 2015

## ASTRONOMIA PARA DOCÊNCIA: ASTROFÍSICA

SISTEMA SOLAR – 15 semanas ou 130 horas (60 inscritos)  
ASTROFÍSICA - 30 semanas ou 240 horas (40 inscritos)

1. Adriana Aparecida dos Santos
2. Aguinaldo Curti
3. Cleber Roberto da Silva
4. Daisy Alves Cardoso
5. Danila Farias Brito Ribeiro
6. Denise Martins de Araújo
7. Fernanda Cristina Franco Paixão
8. Francisco Antonio Parra
9. Francisco Rodrigues da Silva
10. Hilton Koiti Sato
11. Ludemar Paladino
12. Regiane Sales Nogueira Jurazeki
13. Sara dos Santos Dias
14. Ubiratan de Campos
15. *Marta Estavas Kogikoski\**
16. *William José Fernandes\**

\*Cursaram apenas a parte de sistema Solar.

## Appendix C

### C1 - Papers published by Brazilian authors containing data from the SOAR Telescope, per year.

#### 2015

Bica, E.; Santiago, B.; Bonatto, C.; Garcia-Dias, R.; Kerber, L.; Dias, B.; Barbuy, B.; Balbinot, E.; 2015, Monthly Notices of the Royal Astronomical Society, 453, 3190 - "**Bridge over troubled gas: clusters and associations under the SMC and LMC tidal stresses**" (<http://adsabs.harvard.edu/abs/2015MNRAS.453.3190B>)

Hansen, T.; Hansen, C. J.; Christlieb, N.; Beers, T. C.; Yong, D.; Bessell, M. S.; Frebel, A.; García Pérez, A. E.; Placco, V. M.; Norris, J. E.; Asplund, M.; 2015, The Astrophysical Journal, 807, id. 173 - "**An Elemental Assay of Very, Extremely, and Ultra-metal-poor Stars**" (<http://adsabs.harvard.edu/abs/2015ApJ...807..173H>)

Oksala, M. E.; Grunhut, J. H.; Kraus, M.; Borges Fernandes, M.; Neiner, C.; Condori, C. A. H.; Campagnolo, J. C. N.; Souza, T. B.; 2015, Astronomy & Astrophysics, 578, id.A112 - "**An infrared diagnostic for magnetism in hot stars**" (<http://adsabs.harvard.edu/abs/2015A%26A...578A.112O>)

Navarete, F.; Damineli, A.; Barbosa, C. L.; Blum, R. D.; 2015, Monthly Notices of the Royal Astronomical Society, 450, p.4364 - "**A survey of extended H<sub>2</sub> emission from massive YSOs**" (<http://adsabs.harvard.edu/abs/2015MNRAS.450.4364N>)

Takeda, Larissa; Diaz, Marcos; 2015, New Astronomy, 39, p. 64 - "**A search and modeling of peculiar narrow transient line components in novae spectra**" (<http://adsabs.harvard.edu/abs/2015NewA...39...64T>)

Silva, K. M. G.; Rodrigues, C. V.; Oliveira, A. S.; Almeida, L. A.; Cieslinski, D.; Costa, J. E. R.; Jablonski, F. J.; 2015, Monthly Notices of the Royal Astronomical Society, 451, p. 4183 - "**MLS110213:022733+130617: a new eclipsing polar above the period gap**" (<http://adsabs.harvard.edu/abs/2015MNRAS.451.4183S>)

Martinazzi, E.; Kepler, S. O.; Costa, J. E. S.; Pieres, A.; Bonatto, C.; Bica, E.; Fraga, L.; 2015, Monthly Notices of the Royal Astronomical Society, 447, p.2235 - "**New SX Phe variables in the globular cluster NGC 288**" (<http://adsabs.harvard.edu/abs/2015MNRAS.447.2235M>)

Lindsay, S. S.; Marchis, F.; Emery, J. P.; Enriquez, J. E.; Assafin, M.; 2015, Icarus, 247, p. 53 "**Composition, mineralogy, and porosity of multiple asteroid systems from visible and near-infrared spectral data**" (<http://adsabs.harvard.edu/abs/2015Icar..247...53L>)

Schimoia, Jaderson S.; Storchi-Bergmann, Thaisa; Grupe, Dirk; Eracleous, Michael; Peterson, Bradley M.; Baldwin, Jack A.; Nemmen, Rodrigo S.; Winge, Cláudia; 2015, The Astrophysical Journal, 800, id. 63 - "**Short-timescale Monitoring of the X-Ray, UV, and Broad Double-peak Emission Line of the Nucleus of NGC 1097**" (<http://adsabs.harvard.edu/abs/2015ApJ...800...63S>)

**2014**

Borissova, J.; Chené, A.-N.; Ramírez Alegría, S.; Sharma, S.; Clarke, J. R. A.; Kurtev, R.; Negueruela, I.; Marco, A.; Amigo, P.; Minniti, D.; Bica, E.; Bonatto, C.; Catelan, M.; Fierro, C.; Geisler, D.; Gromadzki, M.; Hempel, M.; Hanson, M. M.; Ivanov, V. D.; Lucas, P.; Majaess, D.; Moni Bidin, C.; Popescu, B.; Saito, R. K.; 2014, *Astronomy & Astrophysics*, 569, id.A24, 25 pp. - **"New galactic star clusters discovered in the VVV survey. Candidates projected on the inner disk and bulge"**  
[\(<http://adsabs.harvard.edu/abs/2014A%26A...569A.24B>\)](http://adsabs.harvard.edu/abs/2014A%26A...569A.24B)

Fornasier, S.; Lazzaro, D.; Alvarez-Candal, A.; Snodgrass, C.; Tozzi, G. P.; Carvano, J. M.; Jiménez-Teja, Y.; Silva, J. S.; Bramich, D. M.; 2014, *Astronomy & Astrophysics*, 568, id.L11, 5 pp. - **"The Centaur 10199 Chariklo: investigation into rotational period, absolute magnitude, and cometary activity"**  
[\(<http://adsabs.harvard.edu/abs/2014A%26A...568L.11F>\)](http://adsabs.harvard.edu/abs/2014A%26A...568L.11F)

Coffey, D.; Longinotti, A. L.; Rodríguez-Ardila, A.; Guainazzi, M.; Miniutti, G.; Bianchi, S.; de la Calle, I.; Piconcelli, E.; Ballo, L.; Linares, M.; 2014, *Monthly Notices of the Royal Astronomical Society*, 443, 1788 pp. - **"Absorption at the dust sublimation radius and the dichotomy between X-ray and optical classification in the Seyfert galaxy H0557-385"**  
[\(<http://adsabs.harvard.edu/abs/2014MNRAS.443.1788C>\)](http://adsabs.harvard.edu/abs/2014MNRAS.443.1788C)

Kepler, S. O.; Fraga, Luciano; Winget, Don Earl; Bell, Keaton; Córscico, Alejandro H.; Werner, Klaus; 2014, *Monthly Notices of the Royal Astronomical Society*, 442, 2278 pp. - **"Discovery of a new PG 1159 (GW Vir) pulsator"**  
[\(<http://adsabs.harvard.edu/abs/2014MNRAS.442.2278K>\)](http://adsabs.harvard.edu/abs/2014MNRAS.442.2278K)

Braga-Ribas, F.; Sicardy, B.; Ortiz, J. L.; Snodgrass, C.; Roques, F.; Vieira-Martins, R.; Camargo, J. I. B.; Assafin, M.; Duffard, R.; Jehin, E.; Pollock, J.; Leiva, R.; Emilio, M.; Machado, D. I.; Colazo, C.; Lellouch, E.; Skottfelt, J.; Gillon, M.; Ligier, N.; Maquet, L.; Benedetti-Rossi, G.; Gomes, A. Ramos; Kervella, P.; Monteiro, H.; Sfair, R.; El Moutamid, M.; Tancredi, G.; Spagnotto, J.; Maury, A.; Morales, N.; Gil-Hutton, R.; Roland, S.; Ceretta, A.; Gu, S.-H.; Wang, X.-B.; Harpsøe, K.; Rabus, M.; Manfroid, J.; Opitom, C.; Vanzi, L.; Mehret, L.; Lorenzini, L.; Schneiter, E. M.; Melia, R.; Lecacheux, J.; Colas, F.; Vachier, F.; Widemann, T.; Almenares, L.; Sandness, R. G.; Char, F.; Perez, V.; Lemos, P.; Martinez, N.; Jørgensen, U. G.; Dominik, M.; Roig, F.; Reichart, D. E.; Lacluyze, A. P.; Haislip, J. B.; Ivarsen, K. M.; Moore, J. P.; Frank, N. R.; Lambas, D. G.; 2014, *Nature*, 508, 72 pp. - **"A ring system detected around the Centaur (10199) Chariklo"**  
[\(<http://adsabs.harvard.edu/abs/2014Natur.508...72B>\)](http://adsabs.harvard.edu/abs/2014Natur.508...72B)

Ribeiro, A. O.; Roig, F.; Cañada-Assandri, M.; Carvano, J. M. F.; Jasmin, F. L.; Alvarez-Candal, A.; Gil-Hutton, R.; 2014, *Planetary and Space Science*, 92, 57 p. - **"The first confirmation of V-type asteroids among the Mars crosser population"**  
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## Appendix D

### Ms and Dr degrees obtained with data from the SOAR and Gemini Telescopes

#### D1 - Ms and Dr degrees obtained with data from the SOAR Telescope

##### Master degrees:

\*Ana Maria Molina Arcila: 2014, USP, Orientador: Fábio de Oliveira Fialho - *"High resolution Fabry-Pérot interferometer - dynamic system modeling and nanopositioning control system design"*.

Germano Schamann Bortolotto: 2014, UFSC, Orientador: Antônio Kanaan - *"Coeficientes de extinção atmosféricas com uma câmera de todo-céu."*

Larissa Takeda : 2014, IAG/USP, Orientador: Marcos Diaz - *"Sobre a origem dos sistemas de linhas estreitas em novas"*

Felipe Donizeti T. Navarete: 2013, IAG/USP, Orientador: Augusto Damineli Neto - *"Procura de estrelas de alta massa em formação"*

Viviane Salvador Alves: 2013, IAG/USP, Orientadora: Sílvia Rossi - *"Calibração de Metalicidades de Estrelas Sub-anãs Pobres em Metais"*

Maria Elidaiana da Silva Pereira: 2012, CBPF, Orientador: Martín Makler - *"Determinação das Elipticidades Intrínsecas das Galáxias para Medidas do Lenteamento Gravitacional Fraco"*

Eduardo Balbinot: 2011, UFRGS, Orientador: Basílio Xavier Santiago - *"Aglomerados de estrelas em estado avançado de dissolução: estudos de caso no grupo local."*

\* Denis Furtado de Andrade: 2011, Poli/USP, Orientador: Francisco Javier Ramirez Fernandez - *"Sistema Embarcado para Aquisição de Imagebs Astronômicas"*

\* Luiz Cavalcanti: 2011, Poli/USP, Orientador: Francisco Javier Ramirez Fernandez - *"Sistema de controle para o filtro óptico sintonizável fabry-perot do instrumento BTFI"*

Bruno Dias: 2010, IAG/USP, Orientadora: Beatriz Barbuy - *"Aglomerados estelares da Pequena Nuvem de Magalhães"*

\* Bruno Quint: 2010, IF/USP, Orientador: Mikya Muramatsu - *"Modelagem numérica de alto nível de filtros do tipo Fabry-Pérot e de redes de difração holográficas para o instrumento BTFI"*

\* Julian David Rodriguez Ramirez: 2010, Poli/USP, Orientador: Francisco Javier Ramirez Fernandez - *"Desempenho de dispositivos fotodetectores com multiplicação de elétrons por avalanche"*

Fabíola Campos: 2009, UFRGS, Orientadores: Kepler de Souza Oliveira e Charles Bonatto - *"Os aglomerados globulares NGC 6366 e NGC 6397"*

\* Referem-se a dissertações de mestrado em instrumentação do SOAR.

#### Doctorate theses:

Diogo Pauletti: 2015, UFSM, Orientador: Marcus V. F. Copetti - *"Mapeamento espectroscópico de propriedades físicas dos remanescentes de Supernova N49 e N11L"*

Bruno Corrêa Quint: 2015, IAG/USP, Orientadora: Claudia Mendes de Oliveira - *"Estudo e caracterização do instrumento Brazilian Tunable Filter Imager"*

Bruno Moreira de Souza Dias: 2014, IAG/USP, Orientadora: Beatriz Barbuy - *"Formação e evolução de aglomerados globulares da Gláxia e Nuvens de Magalhães"*

Aline Beatriz Rauber: 2013, UFSM, Orientador: Marcus V. F. Copetti - *"Variações espaciais de propriedades físicas e químicas das nebulosas planetárias NGC 6302 e NGC 2440"*

Flavia Luzia Jasmim: 2013, ON, Orientadora: Daniela Lazzaro - *"Estudo da composição superficial de diversas classes de pequenos corpos"*

Gabriel Bartosch Caminha: 2013, CBPF, Orientador: Martín Makler - *"Um prelúdio para o levantamento gravitacional forte em levantamentos de grandes áreas"*

Fabíola Campos, 2013, UFRGS, Orientador: Kepler de Souza Oliveira Filho - *"Estudo de evolução estelar através de alongamentos globulares galáticos"*

Igor Antônio Cancela Melnik, 2013, UFSM, Orientador: Marcus V. F. Copetti - *"Estudo dos remanescentes de supernova N 49 e N 63A"*

Júlio César Tello Gálvez, 2012, INPE, Orientador: Francisco Jablonski - *"Análise de binárias eclipsantes no bojo da galáxia com dados OGLE - II usando o código Wilson-Devinney"*

Cristiana Furlanetto, 2012, UFRGS, Orientador: Basílio X. Santiago - *"Arcos gravitacionais em aglomerados de galáxias: detecção, caracterização e modelamento"*

Marcio do Carmo Pinheiro, 2012, UFSM, Orientador: Marcus V. F. Copetti - *"Estudo multibanda do conteúdo estelar de regiões  $h,\{sc\}$  ii} do hemisfério sul"*

Oscar Cavichia, 2012, IAG/USP, Orientador: Roberto D. D. Costa - *"Populações e evolução do bojo e região central da Galáxia "*

Francisco Ferreira de Souza Maia , 2012, UFMG, Orientador: Joao Francisco C. Santos Jr. - *"Caracterização e evolução estrutural de aglomerados abertos Galácticos"*

Tiago Ribeiro: 2011, UFSC, Orientador: Raymundo Baptista - *"Atividade cromosférica"*

*em estrelas de alta rotação e baixa massa"*

Tibério Borges Vale: 2010, UFRGS, Orientador: Basílio Xavier Santiago - *"Influência da Densidade Ambiental na Estrutura de Discos de Galáxias Edge-on"*

Vinícius Moraes Placco: 2010, IAG, Orientadora: Silvia Rossi - *"Busca por Estrelas muito pobres em Metais Baseada no Enriquecimento em Carbono"*

Adriana Pires: 2009, IAG, Orientadores: Christian Motch (Observatoire Astronomique) e Eduardo Janot Pacheco (IAG) - *"Population Study os Radio-Quiet and Termally Emitting"*

Mairan Teodoro: 2009, IAG, Orientador: Augusto Damineli - *"Análise Multi-espectral dos eventos cíclicos de n Carinae"*

## **D2 - Ms and Dr theses obtained with data from the Gemini Telescopes** **Teses doutorado:**

Daniel Ruschel Dutra: 2015, UFRGS, Orientadora: Miriani Pastoriza - *"O ambiente circum-nuclear em galáxias ativas: formação estelar, toro de poeira e cinemática do gás"*

Daniel Alf Drehmer: 2015, UFRGS, Orientadora: Thaisa Storchi Bergmann - *"Cinemática Escalar, Modelos Dinâmicos e Determinação de Massas de Buracos Negros Supermassivos"*

José Andrés Hernández Jiménez: 2015, UFRGS, Orientadora: Miriani Pastoriza - *"Efeitos da Interação na Cinemática, Morfologia e Dinâmica das Galáxias em Fusão Menor: AM1219-430, AM2058-381 e AM1228-260"*

Beatriz Fernandes: 2014, IAG/USP, Orientadora: Jane Gregorio-Hetem - *"Características espectrais de estrelas jovens associadas à nebulosa Sh2-296"*

Paula Maria Fernanda Urrutia Viscarra: 2014, IAG/USP, Orientadora: Cláudia Mendes de Oliveira - *"As propriedades e o caminho evolutivo das regiões de formação estelar no meio intergaláctico."*

Flávia Luzia Jasmim: 2013, ON, Orientadora: Daniela Lazzaro - *"Estudo da composição superficial de diversas classes de pequenos corpos"*

David Sanmartim, 2013, UFRGS, Orientadora: Thaisa Storchi Bergmann - *"População estelar e cinemática de quasares post-starburst"*

Gabriel Bartosch Caminha: 2013, CBPF, Orientador: Martín Makler - *"Um Prelúdio Para o Levantamento Gravitacional Forte em Levantamentos de Grandes Áreas"*

Allan Schnorr Muller: 2013, UFRGS, Orientadora: Thaisa Storchi Bergmann -

**"Alimentação do Buraco Negro Supermassivo no Núcleo de Galáxias Ativas"**

Ana Beatriz de Mello: 2013, ON, Orientadora: Silvia Lorenz Martins - **"C-J Ricas em Silicato: Binaridade, Discos de Poeira e seu Lugar no Universo das Estrelas Carbonadas"**

Tiago V. Ricci: 2013, IAG/USP, Orientador: João E. Steiner - **"Análise da emissão nuclear e circumnuclear de gás de uma amostra de 10 galáxias elípticas e lenticulares"**

Dinalva Aires de Sales: 2012, UFRGS, Orientadora: Miriani Pastoriza - **"Propriedades físicas dos silicatos e hidrocarbonetos aromáticos policíclicos presentes na região nuclear das galáxias Seyferts e Starburst"**

Francisco Ferreira de Souza Maia: 2012, UFMG, Orientador: Joao Francisco C. Santos Jr. - **"Caracterização e evolução estrutural de aglomerados abertos Galácticos"**

Roberto Bertoldo Menezes: 2012, IAG/USP, Orientador: João Evangelista Steiner - **"Espectroscopia 3D de núcleos ativos de galáxias: tratamento e análise de dados no óptico e no infravermelho próximo"**

Manoel Vieira de Moraes Jr.: 2010, IAG/USP, Orientador: Marcos Perez Diaz - **"Tratamento das condensações em modelos de fotoionização de envoltório de novas: aplicação em HR Delphini e V842 Centauri"**

Luan Ghezzi Ferreira Pinho: 2010, ON, Orientadora: Katia Cunha - **"Metalicidades e Abundâncias de Lítio em Estrelas com Planetas como Vínculos para os Modelos de Formação Planetária"**

Vinícius Bordalo Schmidt Marques: 2009, ON, Orientador: José Eduardo Telles - **"Cinemática Interna: a relação L-sigma das galáxias H II."**

Alan Alves Brito: 2008, IAG/USP, Orientadora: Beatriz Barbuy - **"Aglomerados Blobulares Ricos em Metais: Traçadores da Evolução Química da Galáxia."**

Sérgio Scarano: 2008, IAG/USP, Orientador: Jacques Lepine - **"Curvas de Rota e o Gradiente de Metalicidade de Galáxias Espirais: o Papel da Corrota e Novas Observações"**

Rogemar A. Riffel: 2008, UFRGS, Orientadora: Thaisa Storchi Bergmann - **"Mapeamento "tridimensional" do entorno dos buracos negros supermassivos em galáxias Seyfert"**

Patrício Lagos: 2008, ON, Orientador: José Eduardo Telles - **"Distribuição espacial das populações estelares e o meio interestelar nas galáxias HII"**

Sandro Barboza Rembold: 2007, UFRGS, Orientadora: Miriani G. Pastoriza - **"Propriedades dinâmicas e populacionais do aglomerado de galáxias LCDCS-S001"**

Fausto Barbosa: 2007, UFRGS, Orientadora: Thaisa Storchi Bergmann - "*Cinemática estelar e de linhas de emissão na região nuclear de galáxias Seyfert com uso de espectrografia IFU*"

Barbara Garcia Castanheira: 2007, UFRGS, Orientador: Kepler de S. Oliveira Filho - "*Sismologia das estrelas ZZ Ceti*"

Natalia Veronica Boris: 2006, IAG/USP, Orientador: Laerte Sodré Jr. - "*Busca de Estruturas em Grandes Escalas em Altos Redshifts: Estudo Fotometrico de Quatro Campos contendo Pares de Quasares em z~1*"

Alvaro Alvares-Candal: 2006, ON, Orientadora: Daniela Lazzaro - "*Inter-relação e Propriedades Físicas de Asteróides Cometas e Objetos Trans-netunianos*".

Elysandra Figueiredo: 2005, IAG/USP, Orientador: Augusto Damineli - "*Conteúdo Estelar de Regiões HII Gigantes da Galáxia*"

Cassio Leandro Dal Ri Barbosa: 2004, IAG/USP, Orientador: Augusto Damineli - "*O Ambiente de Formação de Estrelas de Alta Massa*"

Eduardo Serra Cypriano: 2002, IAG/USP, Orientador: Laerte Sodré Jr. - "*Lentes Gravitacionais em Aglomerados de Galáxias*"

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### Master degrees:

Luis Gabriel Dahmer Hahn: 2015, UNIFEI, Orientador: Alberto Rodríguez Ardila - "*Mecanismos de Excitação, População Estelar e Propriedades Físicas de LINERs no Óptico e Infravermelho Próximo*"

Anelise Audibert: 2015, UFRGS, Orientador: Rogemar Riffel - "*Testando as propriedades do modelo unificado de Galáxias de núcleo ativo*"

Rafael Fraga Guerço: 2015, ON, Orientadora: Katia Cunha - "*A abundância de flúor na Via Láctea*"

Carine Brum: 2015, UFRGS, Orientador: Rogemar Riffel - "*Cinemática e distribuição do gás ionizado na Região Central das Galáxias Seyfert NGC4501 e NGC3982*"

Moiré G. Hennig: 2014, UFSM, Orientador: Rogemar Riffel - "*Tomografia PCA aplicada a Cubos de Dados no Infravermelho próximo a Galáxia Seyfert Mrk 1066*"

Isadora Chaves Bicalho Domingos: 2014, ON, Orientador: José Eduardo Telles - "*Galáxias Anãs com Linhas de Emissão Largas*"

Maiara Sampaio Carvalho: 2014, UESC, Orientador: Henri Michel Pierre Plana - "*Cinemática das galáxias HII: UM461 e CTS1020*"

Evelyn Cristine de Freitas Marques Martins: 2014, UNIVAP, Orientador: Cássio Leandro Dal Ri Barbosa - "*População Estelar da Região W51*"

Marlon Rodrigo Diniz: 2013, UFSM, Orientador: Rogemar Riffel - "*Cinemática Bidimensional da Região Central das Galáxias Seyfert NGC 1068 e NGC 2110*"

Nathália Cibirka de Oliveira: 2013, IAG/USP, Orientador: Eduardo Cypriano - "*Espectroscopia multi-objeto de aglomerados de galáxias com arcos gravitacionais*"

Astor Schonell Jr: 2013, UFSM, Orientador: Rogemar Riffel - "*A distribuição e a cinemática do gás em MRK 766 vistas em detalhes a partir de observações no infravermelho*"

Guilherme dos Santos Couto: 2012, UFRGS, Orientadora: Thaisa Storchi Bergmann - "*A natureza dos braços espirais nucleares da galáxia ativa Arp102B*"

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