The CoRoT NGC 2264 short run

A collaborative project proposed by a large community in response to CoRoT AO-1 for additional program, addressing a broad range of scientific programs

The team

- PI F. Favata (ESA)
- YSOs and circumstellar matter team
  - Team leader S. Alencar (Belo Horizonte, Grenoble)
  - 10 members (Brazil, France, Germany, Portugal, UK)
- Rotation and activity team
  - Team leader G. Micela (Palermo – Italy)
  - 10 members (Italy, UK, ESA, USA)
- Asteroseismology of IM stars team
  - Team leader K. Zwintz (Vienna – Austria)
  - 19 members (Belgium, Spain, France, Austria, Italy, UK)
- Planetary and stellar eclipses team
  - Team leader S. Aigrain (Cambridge – UK)
  - 10 members (France, UK, Switzerland, Brazil, Israel)

4 main scientific topics

- Key aim is to study young PMS stars
- Four main topics identified:
  - Interaction of YSOs and circumstellar matter
    - Map disk structure, accretion streams, and determine accretion rates and variability
  - Rotation and activity
    - Rotation rates for unbiased sample, flares
  - Asteroseismology of intermediate mass stars
    - Can see stellar evolution in real time!
  - Planetary and stellar eclipses
    - Planetary mass companions and PMS eclipsing binaries
- Can be best achieved by placing NGC 2264 on an exo-CCD

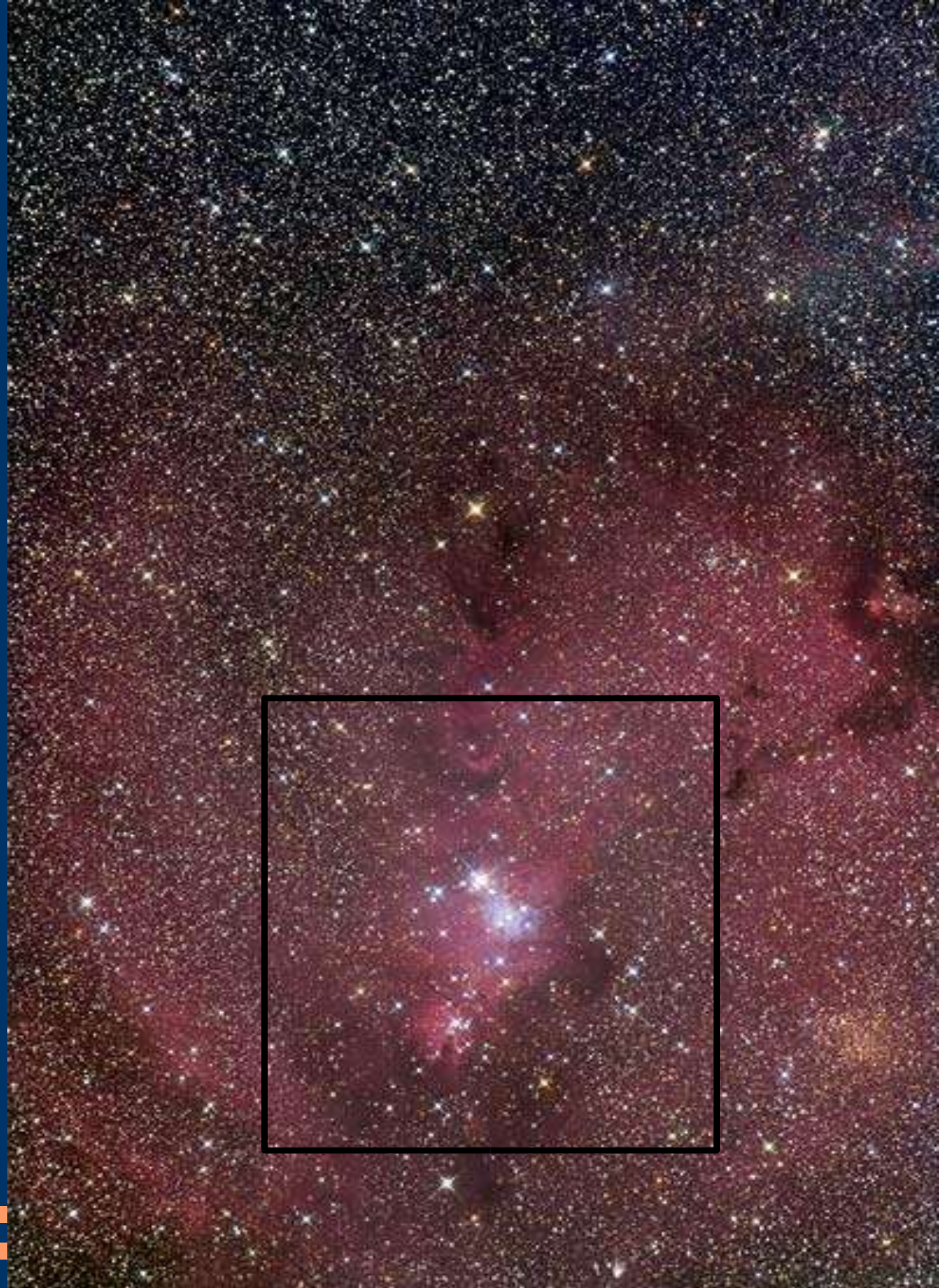
The target: NGC 2264

- Unique opportunity for CoRoT
- Nearby (d=300 pc) star forming region
  - Only one of its type accessible to CoRoT
- Moderate obscuration, most stars optically visible
- Cluster diameter ca. 1 degree
- Fits perfectly w/in 1 CCD in CoRoT
- Absorption wall behind cluster reduces confusion
  - Crowding unlikely to be an issue
- Well studied at other wavelenghts
  - Good membership, sample of rotational periods, X-ray properties

NGC 2264 in visible light

Image 2.7 deg width comparable to the CoRoT FOV

Also shown is a single exo-CCD size, and the approximate proposed placement



The central 40 arcmin of NGC 2264

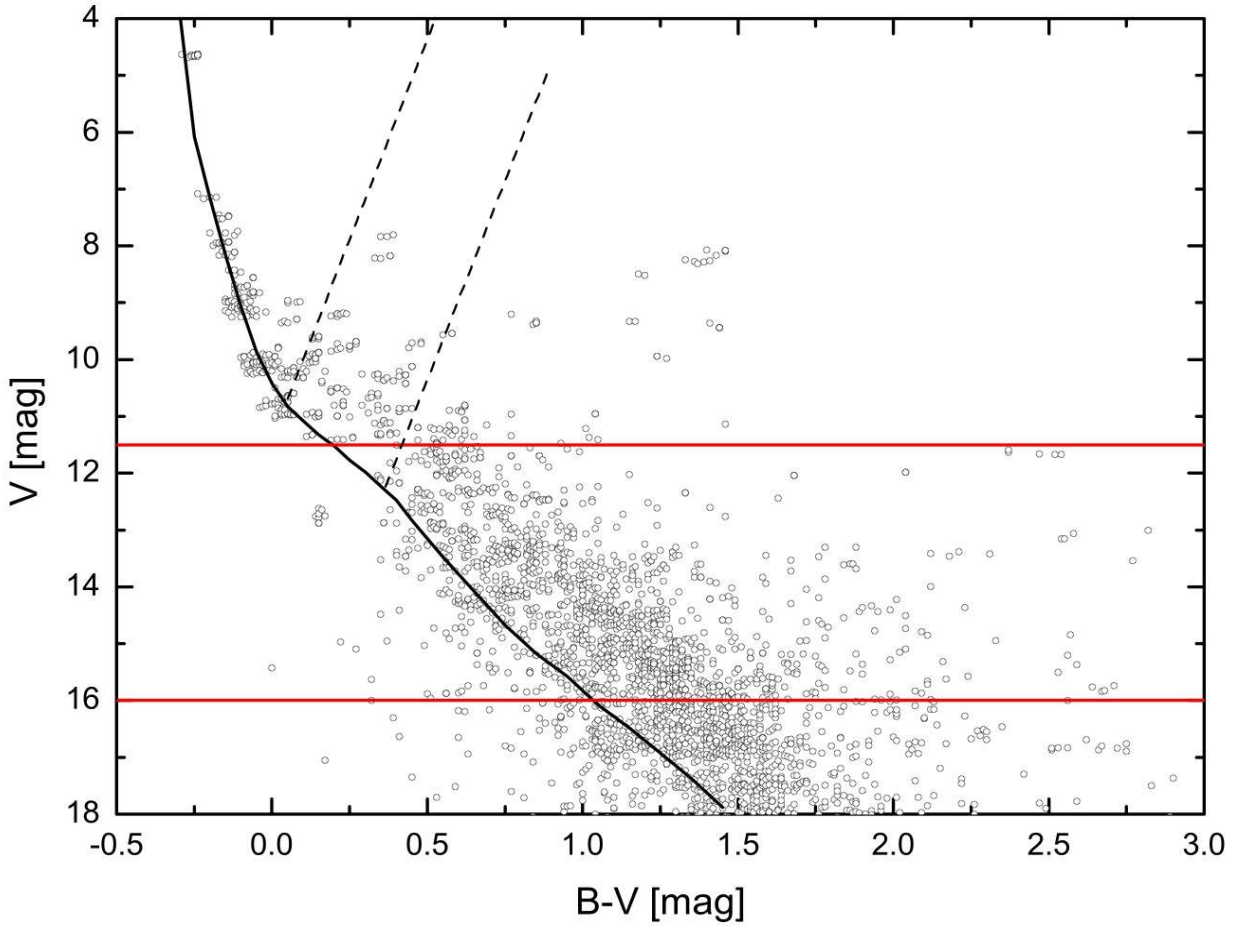
Problems to address

- Sky location
  - At the edge of CoRoT eye
  - Will go nearer the center with orbit drift
  - Thus, it may be convenient to observe it in CoRoT's second year
- Nebulosity
  - Structured and bright
  - Will impact photometric accuracy for fainter targets
- Magnitude range
  - Seismic targets across the saturation boundary

NGC 2264 CMD and CoRoT exo magnitude range

Much of the instability strip falls in the saturated range.

Serious effort necessary to recover information from these stars.



The NGC 2264 CoRoT project, conclusions

- An unique opportunity for CoRoT to advance our knowledge about the structure and evolution of YSOs and their environment
- Challenging project, requires close interaction with CoRoT team
- Broad community involvement will ensure broad return and proper data exploitation