HYPERON STARS IN STRONG MAGNETIC FIELDS

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3rd Compact Stars in the QCD Phase Diagram
Guarujá, SP - Brazil

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Lagrangian Density

$$\mathcal{L} = \sum_{b,l} \bar{\psi}_{b,l}(i\gamma_\mu \partial^\mu + q_e \gamma_\mu A^\mu - m_{b,l})\psi_{b,l}$$
$$+ \frac{1}{2}(\partial_\mu \sigma \partial^\mu \sigma - m_\sigma^2 \sigma^2) + \left(-\frac{1}{4}\omega_{\mu\nu}\omega^{\mu\nu} + \frac{1}{2} m_\omega^2 \omega_\mu \omega^\mu \right)$$
$$+ \left(-\frac{1}{4}\boldsymbol{\varrho}_{\mu\nu} \cdot \boldsymbol{\varrho}^{\mu\nu} + \frac{1}{2} m_\varrho^2 \boldsymbol{\varrho}_\mu \cdot \boldsymbol{\varrho}^\mu \right) - \frac{1}{4} F^{\mu\nu} F_{\mu\nu}$$
$$+ \left(g_{\sigma b}^* \bar{\psi}_B \psi_b \sigma - g_{\omega b} \bar{\psi}_B \gamma_\mu \psi_b \omega^\mu - \frac{1}{2} g_{\varrho b} \bar{\psi}_b \gamma_\mu \psi_b \boldsymbol{\tau} \cdot \boldsymbol{\varrho}^\mu \right),$$

where: $g_{\sigma b}^* \equiv m_{\lambda b}^* g_{\sigma b}$ and $m_{\lambda b}^* \equiv \left(1 + \frac{g_\sigma \sigma}{\lambda m_b}\right)^{-\lambda}$.

Effective Mass: $m_b^* = m_b - \frac{g_{\sigma b}\sigma_0}{\left(1 + \frac{g_\sigma \sigma_0}{\lambda m_b}\right)^\lambda}$

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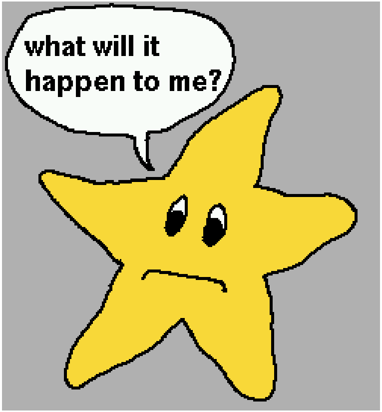
Formalism

- Landau quantization;
- Magnetic field chemical potential dependent;
- Hyperon coupling schemes;
- Anisotropic pressures.



Output

Effects of SMF on NS:

- Equation of state;
- Mass-radius relation;
- Particles population.

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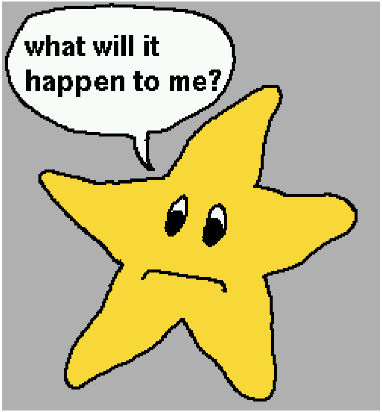

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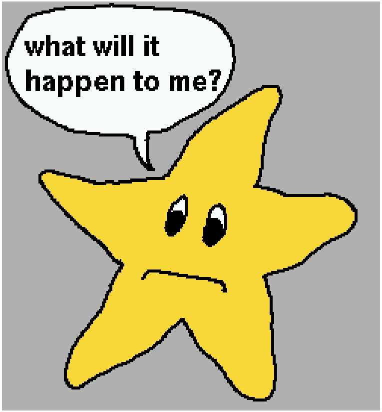

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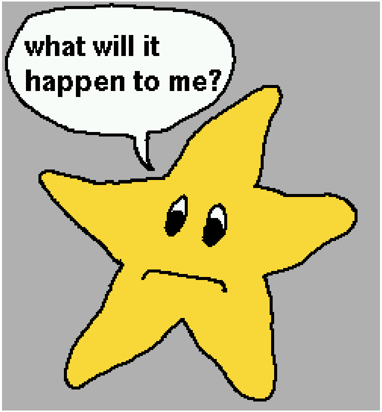

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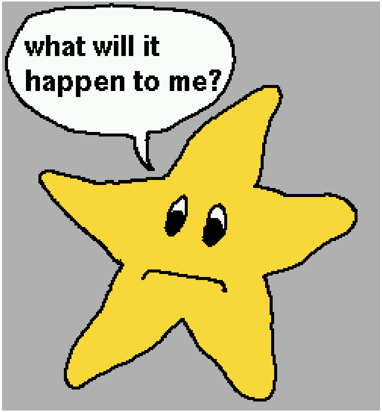

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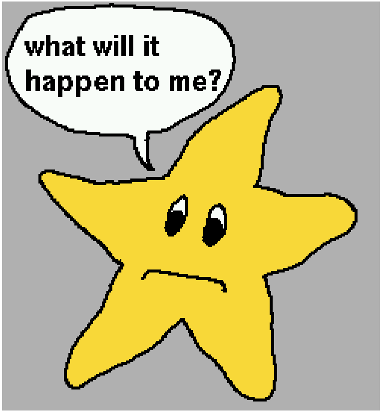

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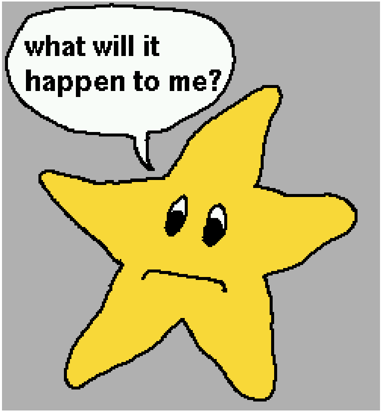

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