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multidisciplinary centre for astrophysics

FCT

Fundação para a Ciência e a Tecnologia

MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

Neutron Stars in Horndeski Gravity

A. Maselli, H. O. Silva, M. Minamitsuji and E. Berti, Phys.Rev. D 93, 124056 (2016)

– “Fab Four” subclass of Horndeski gravity

$$\mathcal{L}_G[g_{\mu\nu}, \phi] = \mathcal{L}_{\text{george}} + \mathcal{L}_{\text{ringo}} + \mathcal{L}_{\text{john}} + \mathcal{L}_{\text{paul}},$$

$$\mathcal{L}_{\text{george}} = V_{\text{george}}(\phi)R,$$

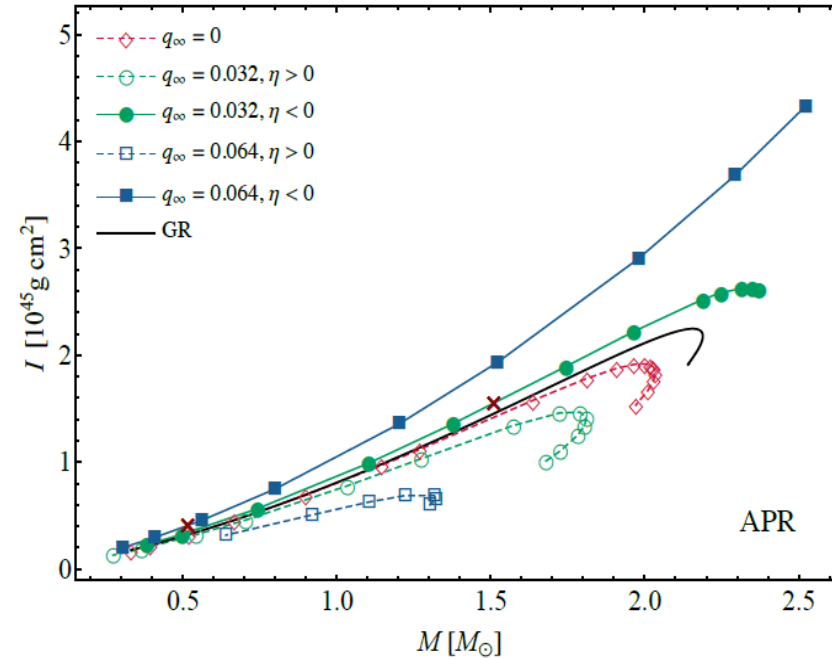
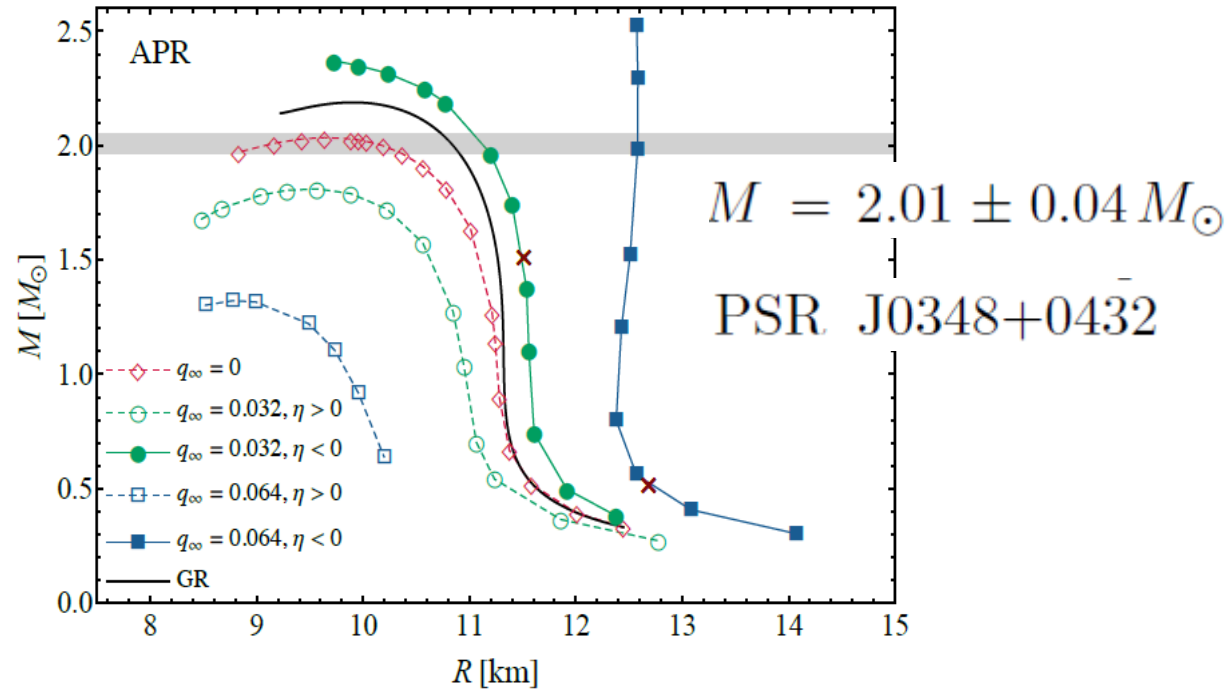
$$\mathcal{L}_{\text{ringo}} = V_{\text{ringo}}(\phi)R_{\text{GB}},$$

$$\mathcal{L}_{\text{john}} = V_{\text{john}}(\phi)G^{\mu\nu}\nabla_{\mu}\phi\nabla_{\nu}\phi,$$

$$\mathcal{L}_{\text{paul}} = V_{\text{paul}}(\phi)P^{\mu\nu\alpha\beta}\nabla_{\mu}\phi\nabla_{\alpha}\phi\nabla_{\nu}\nabla_{\beta}\phi.$$

Dynamical “self-tuning” of the vacuum energy

- John Subclass $\mathcal{L} = \kappa R - \frac{1}{2}(\beta g^{\mu\nu} - \eta G^{\mu\nu})\partial_\mu\phi\partial_\nu\phi$



$$q_\infty = \frac{q}{\sqrt{A_\infty}}$$

$$\eta = \pm 1$$

Stable slowly rotating NSs

- Paul Subclass $\mathcal{L} = R - \frac{1}{3}\alpha P^{\mu\nu\alpha\beta}\nabla_\mu\phi\nabla_\alpha\phi\nabla_\nu\nabla_\beta\phi$

A pathological behavior of the NSs