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Constraining the Phase Space for Chameleon Dark Energy

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<p>A number of solutions to the dark energy problem have been proposed in literature, the simplest is the cosmological constant Λ. But the cosmological constant lacks theoretical explanation for its extremely small value, thus dark energy is more generally modeled as quintessence scalar field rolling down a flat potential. For the quintessence scalar field to be evolving on cosmological scales to day its mass must be of order H₀ , which is the present value of the Hubble constant. A scalar field φ whose mass varies with the background energy density was proposed by Khoury and Weltman(2003). This scalar field can evolve cosmologically while having coupling (β) to different matter fields of order unity. Such a scalar field also couples to photons in the presence of an external magnetic field via the φF<sup>

2</sup> interaction, where F stands for the electromagnetic field strength tensor. The chameleon(φ)-photon coupling of this nature causes a conversion of photons to light Chameleon(φ) particles and vice versa. In this work we investigate this effect on pulsars, and we constrain the parameter space of this theory.

Level (Hons, MSc,
   PhD, other)?

MSc

Consider for a student
   award (Yes / No)?

Yes

Would you like to
 submit a short paper
 for the Conference
 Proceedings (Yes / No)?

Yes

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