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Constraining Axion-like Particles Using the White Dwarf Initial-final Mass Relation

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Axion-like particles (ALPs), a class of pseudoscalars common to many extensions of the Standard Model, have the capacity to drain energy from the interiors of stars and consequently can be constrained through their impact on stellar evolution. In this talk I will derive a new constraint on ALPs which couple exclusively to photons, based on their effects on the white dwarf initial-final mass relation (IFMR). I will highlight the sensitivity of the IFMR and the asymptotic giant branch (the late-life evolutionary phase of stars with initial masses less than $8M_{\odot}$) to ALPs in a presently unconstrained region of parameter space, the cosmological triangle. The future prospects of this constraint will also be discussed.

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