

Astroparticle constraints from lensing time delay measurements at different wavelengths

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The use of gravitational time delays of macro-lenses to constrain the photon mass and the Lorentz Invariance Violation scale is investigated. The influence of photon masses on the measured time delays of macro-lenses is derived. The sensitivity of time delays to the photon mass is illustrated by a bound obtained from 3 AGN which have measurements in several passbands. The bound obtained is comparable to the limit with the deflection of radio waves by the Sun. A similar formalism is applied to obtain deviations of the macro-Lens time delay due to Lorentz invariance violating effects in the propagation of high energy photons. The bounds on the Lorentz invariance scale obtained are much weaker than those obtained by high energy and very high energy instruments, but are independent of source emission models.

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