

Violation of the Magnification Theorem in Gravitational Lensing

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Abstract

One of the central theorems in gravitational lensing yields universal relations between the magnification of close images. We shall discuss this magnification theorem and show examples where the theorem is obeyed in nature. Interestingly, there are also observed cases where the theorem is violated. We show how the violation of the magnification theorem points to a new mathematical direction in gravitational lensing that has applications to the cold dark matter theory on galactic scales. This new mathematical direction requires developing a stochastic theory of gravitational lensing, one that touches on heavy tails and the statistics of critical points.

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