

# Unveiling long range dark forces with the Large Scale Structure of the Universe

*Wednesday, 8 May 2024 13:45 (30 minutes)*

The equivalence between the inertial and gravitational mass is built-in the formulation of General Relativity as the curvature of space time. In the visible sector, the equivalence principle has been tested with extraordinary precision, but very little is known about the presence of long range fifth forces in the dark sector. In this talk I will describe how we can use cosmological data to test if dark matter violates the equivalence principle. The Universe itself will act as a scale, measuring whether dark matter particles fall in the same way as ordinary particles. After discussing the main effects of dark fifth forces on cosmological observables like the CMB and matter power spectrum, I will present the constraints on the strength of the new interaction using Planck and Large Scale Structure data. Our results indicate that equivalence principle violations in the dark sector are at most a few parts in one thousand, which is the best available bound on such new forces. Some implications of these bounds for the direct detection of dark matter will also be discussed.

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