

# Gravitational lensing from clusters of galaxies to test Disformal Couplings Theories

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In this study, we investigate the potential existence of a non-minimal coupling between dark matter and gravity using a compilation of galaxy clusters. We focus on the disformal scenario of a non-minimal model with an associated coupling length  $L$ . Within the Newtonian approximation, this model introduces a modification to the Poisson equation, characterized by a term proportional to  $L^2 \nabla^2 \rho$  where  $\rho$  represents the density of the DM field. We have tested our model using the data of CLASH survey. We found a nearly perfect correlation between the coupling constant  $L$  and the standard Navarro–Frenk–White scale parameter  $r_s$ , hinting at a compelling link between these two lengths.

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