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Understanding Lcdm and Constraining Modified gravity using stacked galaxy clusters' caustics

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We perform a stacking analysis of galaxy cluster velocity phase space using the caustic technique. By stacking 128 clusters, we create four robust stacked clusters with excellent agreement between caustic masses and binned medians. We model the gravitational potential using the NFW profile, validating the Λ CDM mass-concentration relation. Implementing the Chameleon screening model, we find constraints on modified gravity parameters consistent with Λ CDM, yielding stringent upper limits of $|f_{R0}|$ less than 4×10^{-6} at 95% C.L. for $f(\mathcal{R})$ gravity.

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