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LPENS Particle physics phenomenology and cosmology

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LPENS, L382 - LPENS - 24 rue Lhomond 75005 PARIS
Domaines : astro-ph—hep-ph

Titre : *A new probe of dark energy*

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Résumé : *Galaxy clusters are immensely fruitful laboratories for cosmology. In the past three decades, great progress has been made in understanding their composition, dynamics, and role in the cosmic web. Cluster interiors, i.e., their relaxed parts, are well understood by now, as they have been exhaustively studied. However, we have not taken full advantage of their outer portions, which are arguably equally rich in terms of their potential to help us understand the cosmos.*

In the past two years, we have developed the understanding that a very important scale for cosmology is the turnaround scale, which is the scale around a cluster after which galaxies join the Hubble flow. We have now developed analytical descriptions of the outer portion of cluster density profiles on the turnaround scale as well as mass scaling relations connecting overdensity masses (such as M200) at the interior of clusters with the turnaround mass. Being equipped with a density profile sensitive to the turnaround scale and a scaling relation for determining the mass enclosed therein we can build a novel test for our cosmology.