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Constraining the nature of dark matter through joint X-ray/SZ data

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The LambdaCDM model of cosmology makes clear predictions on the shape of collapsed halos in the Universe. The radial mass density profiles should follow a universal form across a wide range of halo masses and redshifts. Deviations from the predicted universal profile would provide us clues on fundamental properties of dark matter particles (e.g. self-interaction cross section, warm dark matter mass) and on any modification of the laws of gravity on large scales. Under the hydrostatic equilibrium assumption, precise constraints on the shape of the mass profiles can be obtained from a joint analysis of X-ray and SZ data. I will discuss how this technique can be used to determine the shape of the mass profiles across a wide radial range in the X-COP sample. The resulting profiles will then be used to set new constraints on the fundamental properties of dark matter.

Primary authors: ECKERT, Dominique (Department of Astronomy, University of Geneva); ETTORI, Stefano (INAF OA Bologna)

Presenter: ECKERT, Dominique (Department of Astronomy, University of Geneva)