



Contribution ID: 31

Type: **not specified**

X-ray, SZ and dark matter in galaxy clusters

Wednesday, 30 June 2021 11:05 (30 minutes)

Galaxy clusters are dark-matter dominated systems enclosed in a volume that is a high-density microcosm of the rest of the universe.

I will present the most recent results on the distribution of their gravitating and baryonic mass obtained from our projects XMM-Newton Cluster Outskirts Project (X-COP) and CLASH, and how we will improve these constraints with our ongoing XMM-Newton Heritage Cluster Project (CHEX-MATE; <http://xmm-heritage.oas.inaf.it/>), highlighting the role of X-ray (and SZ data) in resolving the astrophysics of the most massive collapsed halos in the universe and in studying the interplay between the hot plasma and the dark matter. I will conclude by discussing the role that the next generation of X-ray observatories (like Athena) will play to construct a consistent picture of the formation and composition of galaxy clusters.

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