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The X-ray Universe as seen through a Super Computer

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Abstract. We use the Magneticum Pathfinder (**www.magneticum.org**) hydro-dynamical cosmological simulation set to investigate the footprint of AGNs in clusters for future X-ray missions like eROSITA and ATHENA. The simulations treat metal-dependent radiative cooling, heating from a uniform time-dependent ultraviolet background, star formation and the chemo-energetic evolution of the stellar population as traced by SNIa, SNII and AGB stars with the associated feedback processes, as well as formation and evolution of super-massive black holes and the associated quasar and radio-mode feedback processes. For a detailed description see Biffi et al. (2013) and Hirschmann et al. (2014).

Keywords. hydrodynamics, numerical, X-rays, galaxy clusters, active galactic nuclei

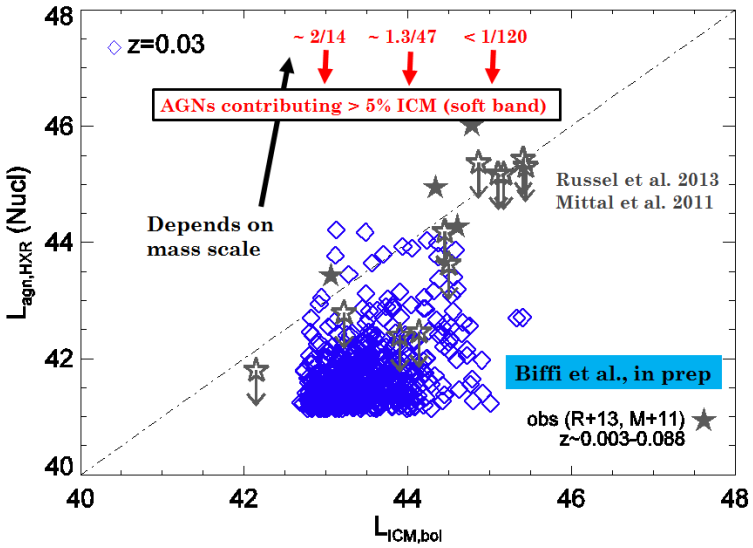

Figure 1. X-ray luminosity of the central AGNs versus the ICM bolometric luminosity from the simulations (blue diamonds) and comparison to observational detections an upper limits (gray asterisks). The plot also indicates the number of AGNs found in member galaxies. Our simulations contain typically 14 well resolved member galaxies in low mass, group like systems with $L_{bol} \approx 10^{43}$erg/s, of which on average two are hosting AGNs with X-ray luminosities of at least 5% of the host halo. For galaxy clusters with $L_{bol} \approx 10^{45}$egs/s we find on average more than 100 well resolved member galaxies, of which typically one (but sometimes even none) hosts an AGN with X-ray luminosity of at least 5% of the host halo.

References

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