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The effect of feedback on the emission properties of the Warm-Hot Intergalactic Medium

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At present, 30-40 per cent of the baryons in the local Universe is still undetected. According to theoretical predictions, this gas should reside in filaments filling the large-scale structure (LSS) in the form of a Warm-Hot Intergalactic Medium (WHIM), at temperatures of 10^5 - 10^7 K, thus emitting in the soft X-ray energies via free-free interaction and line emission from heavy elements. In this work we characterize the properties of the X-ray emission of the WHIM, and the LSS in general, focusing on the influence of different physical mechanisms, namely galactic winds (GWs), black-hole feedback and star-formation, and providing estimates of possible observational constraints. To this purpose we use a set of cosmological hydrodynamical simulations that include a self-consistent treatment of star-formation and chemical enrichment of the intergalactic medium, that allows us to follow the evolution of different metal species. We construct a set of simulated light-cones to make predictions of the emission in the 0.3-10 keV energy range. We obtain that GWs increase by a factor of 2 the emission of both galaxy clusters and WHIM. The amount of oxygen at average temperature and, consequently, the amount of expected bright Ovii and Oviii lines is increased by a factor of 3 due to GWs and by 20 per cent when assuming a top-heavy IMF. We compare our results with current observational constraints and find that the emission from faint groups and WHIM should account from half to all of the unresolved X-ray background in the 1-2 keV band.

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