

Q25a Can Warm-hot Intergalactic Medium Account for the Spatial Fluctuation of the Soft Diffuse X-ray Background?

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The spatial distribution of the soft diffuse X-ray background (SDXB) has long been proposed as a diagnosis of the warm-hot intergalactic medium (WHIM), which is believed to be pervasive inside the filamentary structures of the cosmic web with a gas temperature of 10^{5-7} K. However, several *Chandra* observations of 0.5-2 keV cosmic X-ray background have reported negative results in detecting power spectrum signal from the WHIM. In order to investigate to what extent the WHIM contributes to the cosmic X-ray background fluctuation and whether it is measurable or not, we analyze the spatial power spectrum of *Suzaku* unresolved X-ray background in 0.2–2 keV and compare the observations with the WHIM emission modeled from the IllustrisTNG cosmological simulation. For *Suzaku* X-ray background above 0.5 keV, a large scale signal of $\sim 10^{-9}$ cts² s⁻² deg⁻² @10³ arcsec has been measured for the scale >100 arcsec, below which any spatial feature smears out due to the limitation of point spread function. The power spectrum signal becomes less significant in 0.2–0.5 keV, with the fluctuation $\sim 3 \times 10^{-10}$ cts² s⁻² deg⁻² @10³ arcsec. Based on the resolved X-ray point sources in deep exposure of *XMM-Newton* COSMOS field, the powers originated from the unresolved extragalactic galaxies and AGNs are evaluated. In combination with the fluctuation of the diffuse X-ray emission estimated according to the IllustrisTNG, the model turns out to be consistent with the observation values.