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The AGN-halo connection

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AGNs are the dominant component of extragalactic X-ray sky. Therefore, understanding X-ray emission from AGNs is crucial to understand the origin and evolution of AGNs as well as to extract the X-ray signal from the subdominant components such as circumgalactic and intracluster medium. We have looked into the detailed X-ray AGN modelling which involves combining the luminosity function measurements with the halo occupation distribution (HOD) model of the AGNs. Earlier studies revolving around the cross-correlation of X-ray signal from the hot gas with other signals such as Sunyaev-Zeldovich signal do not include a halo model for AGN unlike the galactic halos, where a well-established halo models do exist. These studies assume that the AGN X-ray power spectrum is completely dominated by the Poisson term. We show that the clustering term of X-ray AGN auto power spectrum can be significant near the angular scales where the contribution from the hot gas peaks. We also show that the clustering term is really sensitive to the underlying HOD model, and therefore, important to take into account while extracting the hot gas signal from an X-ray map.