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Probing the effects of primordial black holes on 21-cm EDGES signal along with interacting dark energy and dark matter - baryon scattering

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21cm radio signal has emerged as an important probe in investigating the dark age of the Universe (recombination to reionization). In the current analysis, we explore the combined effects of primordial black holes (PBH), cooling off of the baryonic matter due to dark matter (DM) - baryon collisions and interaction of dark matter - dark energy (DE) fluid on the 21cm brightness temperature. The variation of brightness temperature shows remarkable dependence on DM mass (m_χ) and the dark matter - baryon scattering cross-section (σ_0). Bounds in m_χ - σ_0 parameter space are obtained for different possible PBH masses and for different interacting dark energy (IDE) models. These bounds are estimated based on the observed excess (-500^{+200}_{-500} mK) of 21cm brightness temperature by EDGES experiment. Eventually, bounds on PBH mass is also obtained for different values of dark matter mass and for different IDE model coupling parameters. The compatibility of the constraints of the IDE models, in the estimated bounds are also addressed.

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