The 32nd Texas Symposium on Relativistic Astrophysics



Contribution ID: 137 Type: Poster

## Imprints of cosmic reionization as a probe of dark matter nature in the post-reionization era

Friday, 15 December 2023 15:44 (1 minute)

We propose a novel mechanism for constraining warm dark matter (WDM) models via the so-called "memory of reionization" effect, which is that the thermal history of gas after cosmic reionization is sensitive to when the gas is reionized. The suppression of small-scale structure due to WDM affects the evolution of post-reionization gas, while thermal relics can couple to ionized bubbles at the scales of tens of Mpc. As such, the small-scale effect due to WDM can leave an imprint on the gas at large scales, which can be observed by Ly $\alpha$  forest and HI 21 cm intensity mapping. We forecast the accuracy of constraints on WDM using Ly $\alpha$  forest 3D power spectrum with DESI-like surveys, and 21 cm power spectrum with SKA1-LOW and PUMA surveys. We demonstrate that this approach can provide unprecedentedly tight constraints on WDM mass.

**Primary authors:** MORALES-GUTIÉRREZ, Catalina (University of Costa Rica); HIRATA, Christopher M. (The Ohio State University); LONG, Heyang (The Ohio State University); MONTERO-CAMACHO, Paulo (Peng Cheng Laboratory); ZHANG, Yao (Tsinghua University); MAO, Yi (Tsinghua University)

Presenter: ZHANG, Yao (Tsinghua University)

Session Classification: Poster