



Contribution ID: 321

Type: **Invited/Solicited talk in mini-symposium**

## Patchy dark screening from dark photon

*Monday, 11 December 2023 14:00 (20 minutes)*

I will discuss anisotropic (patchy) screening induced by the resonant conversion of cosmic microwave background (CMB) photons into light bosons in the dark sector as they cross non-linear large scale structure (LSS). Using kinetically mixed dark photon as an example, I will show how this conversion between CMB photon and light dark photon naturally occurs for a wide range of dark photon masses. This conversion leads to new CMB anisotropies that are correlated with LSS, which we refer to as patchy dark screening, in analogy with anisotropies from Thomson screening. Due to the unique frequency dependence of this conversion optical depth, it is possible to distinguish this signal from the blackbody CMB anisotropies. I will discuss various two- and three-point correlation functions of the dark-screened CMB, as well as correlation functions between CMB and LSS observables, to project the sensitivity of future measurements to the kinetic mixing parameter and mass of the dark photon. I will demonstrate that an analysis with existing CMB data can improve upon current constraints by two orders of magnitude, while data from upcoming experiments such as CMB-S4, CMB-HD and upcoming LSS surveys can further improve the reach by another two orders of magnitude.

**Presenter:** Prof. HUANG, Junwu (Perimeter Institute)

**Session Classification:** Dark Matter