# The 6th Korea Meeting on Particle Physics, ”The latest result of Xenon 1T and whatnot”

# Report of Contributions

Contribution ID: **1** Type: **not specified**

# Exothermic dark matter for XENON1T excess

*Friday 17 July 2020 15:20 (30 minutes)*

Motivated by the recent excess in the electron recoil from XENON1T experiment, we consider the possibility of exothermic dark matter, which is composed of two states with mass splitting. The heavier state down-scatters off the electron into the lighter state, making an appropriate recoil energy required for the Xenon excess even for the standard Maxwellian velocity distribution of dark matter. Accordingly, we determine the mass difference between two component states of dark matter to the peak electron recoil energy at about 2.5 keV up to the detector resolution, accounting for the recoil events over ER=2–3 keV, which are most significant. We include the effects of the phase-space enhancement and the atomic excitation factor to calculate the required scattering cross section for the Xenon excess. We discuss the implications of dark matter interactions in the effective theory for exothermic dark matter and a massive $Z'$ mediator and provide microscopic models realizing the required dark matter and electron couplings to $Z'$.

**Presenter:** LEE, Hyun Min

Contribution ID: **2** Type: **not specified**

# Observation of excess electronic recoil events in XENON1T

*Friday 17 July 2020 16:00 (1 hour)*

**Presenter:** MOLINARIO, Andrea

Contribution ID: **3** Type: **not specified**

# Gauged Lepton Number and Cosmic-ray Boosted Dark Matter for the XENON1T Excess

*Friday 17 July 2020 17:15 (30 minutes)*

The recently reported excess in XENON1T is explained by two scenarios with and without a dark matter interaction with the gauged lepton number, $U(1)_{L_e-L_i}$, $i = \mu or \tau$. In Scenario#1, the gauge boson provides non-standard interaction between solar neutrino and electron that enhances the number of electron recoil events in the XENON1T detector. In Scenario#2 with the gauge coupling to dark matter, dark matter can be boosted by cosmic electrons and generate electron recoil energy up to $\mathcal{O}(keV)$ to explain the XENON1T result. The dark matter, aided by the new gauge interaction, could heat up a neutron star more than 1500 K as a neutron star captures the halo dark matter. Therefore, we propose to utilize the future infrared telescope to te

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