Dark Matter and Neutrino Forum

The Dark Matter and Neutrino Forum at INPAC/TDLI of Shanghai Jiao Tong University is an informal seminar series, which aims to bring together theorists and experimentalists in these areas to discuss very recent developments, particularly topics with high relevance to deep underground experiments.

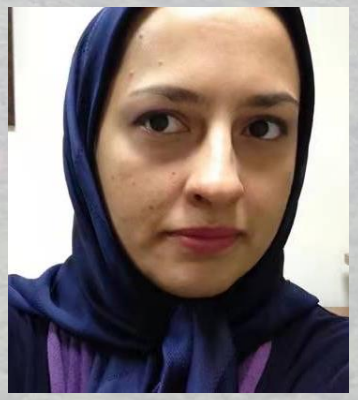
Wandering Pico-charged particles explain both XENON1T electron recoil spectrum and the 511 keV line

Abstract

There is a robust signal for a 511 keV photon line from the galactic center which may originate from dark matter particles with masses of a few MeV. I will introduce a model in which dark matter first decays into a pair of intermediate pico-charged particles CC^{-} with a lifetime much larger than the age of the universe. The galactic magnetic field accumulates the relativistic CC^{-} that eventually annihilate, producing the $e^{-}e^{+}$ pair that give rise to the 511 keV line. This model avoids the bounds from delayed recombination and from the absence of the line from dwarf galaxies which rule out more simplistic DM explanations for the 511 keV line. The relativistic pico-charged C particles from dark matter decay can scatter on the electrons inside the direct dark matter search detectors imparting a recoil energy of Er ~ keV. I show that this model can account for the electron recoil excess recently reported by the XENON1T experiment. Moreover, we show that the XENON1T electron recoil data sets the most stringent bound on the lifetime of the dark matter within this model.

Prof. Yasaman Farzan, *IPM, Tehran*

Biography



Research interest: Neutrino physics, Dark matter model building

Awards and Fellowships

1. Young scientist Abu-Reihan award of science academy of Iran;
2. 2013 ICTP prize;
3. 2008 IUPAP Young Scientist Prize;
4. Assistant professor grant award of Nokhbegan, 2008;
5. ICTP regular associate member, 1 Jan 2016-31 Dec 2021;
6. ICTP junior associate member, 1 Jan 2007-31 Dec 2012;

Zoom information:
https://cern.zoom.us/j/63301425563?pwd=YjJFZWVOTE9LWk5tdHpISXdvcHhrQT09
ID: 633 0142 5563 **Password:** 239864

Time: 14:30 pm Dec/22 (Wednesday), 2021 **Place:** Meeting Room 410, T.D. Lee Library **Host:** Shao-Feng Ge **Mail:**gesf@sjtu.edu.cn

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