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## **Pico-charged particles from dark matter decay explain 511 keV line and XENON1T signal**

*Wednesday, 7 July 2021 10:20 (25 minutes)*

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  $E_r \sim \text{keV}$ . 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.

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