

Virtual Internal Bremsstrahlung of Dark Matter and Connection with AMS-02 Result

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We consider a characteristic gamma-ray signal coming from Virtual Internal Bremsstrahlung (VIB) of Dark Matter, which is the leading process of photon emission generated by Dark Matter annihilation.

The relation between the gamma-ray excess around 130 GeV and the recent positron excess of AMS-02 is discussed. The gamma-ray excess is explained by VIB of Dark Matter. On the other hand, a suitable s-wave of Dark Matter annihilation cross section is required to generate such a positron excess of AMS-02 without conflicting with gamma-ray emission from Final State Radiation. This is achieved by taking into account both of left and right chiral couplings of Yukawa interaction.

In addition, this process tends to make Dark Matter relic density reduce too much due to required large Yukawa coupling. However in the case of scalar Dark Matter, it could be consistent with the observed relic density.

Primary author: Dr TOMA, Takashi (Durham University)

Co-authors: Dr BOEHM, Celine (Durham University); Prof. PASCOLI, Silvia (Durham University)

Presenter: Dr TOMA, Takashi (Durham University)

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