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Effect of Degenerated Particles on Internal Bremsstrahlung of Majorana Dark Matter

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Gamma-ray generated by annihilation or decay of dark matter can be its smoking gun signature. In particular, gamma-ray coming from internal bremsstrahlung of dark matter is promising since it can be a leading emission of sharp gamma-ray. However if thermal production of Majorana dark matter is considered, the derived cross section for internal bremsstrahlung becomes too small to be observed by future gamma-ray experiments. We consider a framework to achieve an enhancement of the cross section by taking into account degenerated particles with dark matter. We find that the enhancement of about order one is possible without conflict with the dark matter relic density. Due to the enhancement, it would be tested by the future experiments such as GAMMA-400 and CTA.

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