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Dark Matter: room for new ideas?

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Dark matter candidates are getting surrounded by direct, indirect detection searches and collider experiments. As of today, none of these experiments have obtained an indisputable proof of the existence of the dark matter particle and they are dreadfully digging into their viable parameter space. One could thus ask if there is still room for new ideas in the dark matter sector.
There has been interest recently on particle physics models that may give rise to sharp gamma ray spectral features from dark matter annihilation. Dark matter being supposedly electrically neutral, it is usually challenging to build WIMP models that may accommodate both a large cross section into gamma rays at, say, the Galactic center, and the right dark matter abundance. In my talk, I will discuss the case of scalar dark matter models actually giving rise to a significant bremsstrahlung emission and I will confront this scenario to the familiar case of a Majorana dark matter. I will show that the scalar dark matter case the virtual internal bremsstrahlung signal may be enhanced by a factor of (up to) two orders of magnitude compared to the present limits.

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