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Electroweak lights from Dark Matter annihilation

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Recent analyses have shown that the inclusion of electroweak corrections can alter significantly the energy spectra of Standard Model particles originated from dark matter annihilations. I will consider the important situation where the radiation of electroweak gauge bosons has a substantial influence: a Majorana dark matter particle annihilating into two light fermions. This process is in p-wave and hence suppressed by the small value of the relative velocity of the annihilating particles. The inclusion of electroweak radiation eludes this suppression and opens up a potentially sizeable s-wave contribution to the annihilation cross section. I will describe this effect in detail and discuss its impact on the fluxes of stable particles resulting from the dark matter annihilations, which are relevant for dark matter indirect searches. I will also comment on the effective field theory approach, pointing out that the opening of the s-wave is missed at the level of dimension-six operators and only encoded by higher orders.

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