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Neutrinos from Dark Matter Annihilation versus the Diffuse Supernova Neutrino Background

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Upcoming neutrino experiments are expected to detect the Diffuse Supernova Neutrino Background (DSNB). This requires pondering all possible sources of background. Sub-GeV dark matter (DM) which annihilates into neutrinos is a potential background that has not been considered so far. We simulate DSNB and DM signals, as well as backgrounds in the Hyper-Kamiokande detector. We find that DM-induced neutrinos could indeed alter the extraction of the correct values of the parameters of interest for DSNB physics. While this opens the possibility of simultaneously characterizing the DSNB and discovering DM via indirect detection, we argue that it would be hard to disentangle the two contributions due to the lack of angular information available at low energies.

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