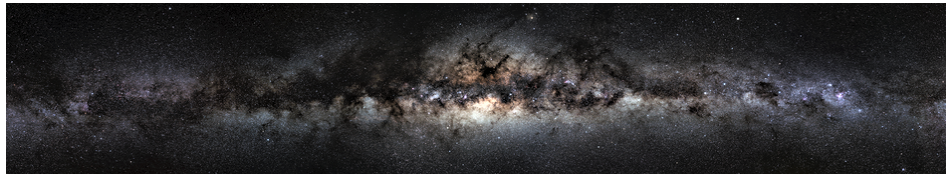


Dark Sectors of Astroparticle Physics (AstroDark-2021): Axions, Neutrinos, Black Holes and Gravitational Waves



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Searching for Pseudo-Dirac Neutrinos in Supernovas

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The discovery of a non-zero mass for neutrinos invites to consider whether they are Dirac or Majorana particles. But those are not the only two possibilities, there is a third one, in which neutrinos are Majorana, but they behave as if they were Dirac particles, that is called pseudo-Dirac particles. The scenario predicts an oscillation between active and sterile neutrinos, with an oscillation length that depends on their mass-squared differences. The present constraints indicate that a low energy neutrino flux that propagates over astrophysical distances is the best candidate to look for any evidence. Therefore, we will concentrate on the neutrino flux emitted from supernovas (SN). In particular, we will analyze the measurement of the SN1987A done by Kamiokande-II, IMB, and Baksan. In case of a SN in the future, the next generation of experiments can also search for an active-sterile oscillation. We concentrate on Hyper-kamiokande and DUNE, that are expected to collect hundreds of events in case of a 10kpc SN, to determine the future sensitivity to this scenario.

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