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Searching for Dark Matter: the direct detection of WIMPs

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The nature of dark matter is one of the outstanding open questions in physics. Although the observational evidence for the existence of a non-baryonic, non-luminous and non-relativistic component of the universe has been strengthened in recent years, its nature still remains unknown. A class of theoretically-motivated non-relativistic particles with masses approximately in the GeV to TeV range, commonly referred to as Weakly Interacting Massive Particles (WIMPs), has been extensively investigated as a constituent of dark matter. Direct detection experiments aim to detect WIMPs by looking for the energy deposited in a detector when a WIMP from our galactic halo scatters off a nucleus of a target/detector sensitive material. In recent years, such detectors have reached the multi-ton scale and even larger ones are being planned. They will become sensitive to astrophysics neutrinos that will generate events via coherent elastic neutrino-nucleus scattering (CEvNS), similar to those of the WIMPs.

Here, we overview the recent progress in WIMP direct detection experiments, discuss the impact of the so called “neutrino fog” and present future directions for WIMP search.

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