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Invited Talk: Search for cosmological dark matter with noble liquids

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Noble liquid detectors are continuing to probe dark matter (DM) candidates in a wide parameter space. They utilize large targets of a very low background with a capability to reconstruct interaction point, allowing active background rejection. Liquid xenon (LXe) is an intrinsically radio-pure, efficient and fast scintillator with the best self-shielding capabilities. Liquid argon (LAr) is an equally efficient scintillator whose timing properties enable excellent rejection against electromagnetic backgrounds such as argon radioactive isotopes. Time projection chamber (TPC) filled with noble liquid offer additional rejection of electromagnetic backgrounds based on ratio of measured ionization and scintillation signals. During the last decade, noble liquid detectors have convincingly demonstrated their sensitivity for “weak” scale DM interacting with nuclear matter and validated the technology to achieve at least two orders of magnitude increase in sensitivity. The light DM candidates can also be probed by using only ionization signal and accurately determining detector response at very low energies. I will review the basic concepts of noble liquid detectors, current state of experiments and projections for the future.

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