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Noble Liquid Detectors for Dark Matter[1]

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The detection of particle dark matter from the cosmos remains one of the most important challenges in physics today. The challenge is being addressed by experiments carried out in space and on Earth, with a variety of detection strategies and technical approaches. The direct detection approach searches for dark matter particles as they scatter in low-background, massive detectors on Earth, shielded from cosmic rays in deep underground laboratories. In the last ten years, the deployment of liquid xenon detectors such as XENON10, XENON100 and very recently LUX, has led to more than two orders of magnitude improvement in the sensitivity of direct detection. Next generation noble liquid experiments, with several thousands of kg of liquid xenon and liquid argon, are under construction or planned, promising another two orders of magnitude sensitivity increase within this decade. I will review the state-of-the-art in dark matter detection with noble liquid detectors worldwide.

[1]Thanks to the NSF for the continued support of the XENON Dark Matter project