

Liquid xenon experiments for WIMP search

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Abstract

The identification of dark matter in the universe is one of the most important issues in the astroparticle physics. Weakly interacting massive particles (WIMPs) are the major category of dark matter candidates. The direct dark matter experiments intend to search for dark matter by observing nuclear recoils by WIMPs in the target material. In the last decade, liquid xenon came to be used as the target for the WIMP search. This is because liquid xenon has many advantages [1]: large atomic number which enhances coherent interaction, high density (3g/cc), high scalability, established purification, good scintillation efficiency, long electron life in TPC mode, etc.

In this talk, status of liquid xenon experiments such as ZEPLIN, XENON, LUX, and PANDA-X are briefly explained. Future experiments such as XENON1t, XMASS1.5, LZ, DARWIN, and MAX projects are mentioned. On the other hand, details of the experiment XMASS are reported. In particular, recent study on the observed spectrum is presented. Sensitivity study for low mass WIMPs and axions as a candidate for dark matter is also shown.

[1] Y. Suzuki, hep-ph/0008296

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