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Current Status and Future Prospects of PandaX

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The PandaX experiment at the China Jinping Underground Laboratory (CJPL) uses large-scale liquid-xenon time projection chambers to search for dark matter and other rare physical processes. PandaX-4T, with a multi-tonne xenon target, has accumulated extensive science data and established competitive constraints on WIMP dark matter, while significantly extending its physics program toward light dark matter, exotic dark-sector interactions, solar neutrinos, and double-beta decay. In this talk, I will present an overview of the current status and recent physics results of PandaX-4T, highlighting the broad discovery potential enabled by its low-background environment and wide energy coverage. I will also discuss the future PandaX program. Building on the experience of PandaX-4T, the collaboration is preparing for the PandaX-40T phase, which will substantially increase the xenon target mass and further improve sensitivity to dark matter interactions toward the neutrino-fog regime. At the same time, the enlarged detector will provide powerful opportunities for neutrino physics and searches for other rare processes, establishing PandaX as a general-purpose underground observatory for particle physics and astrophysics.

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