The PandaX-4T Dark Matter Experiment

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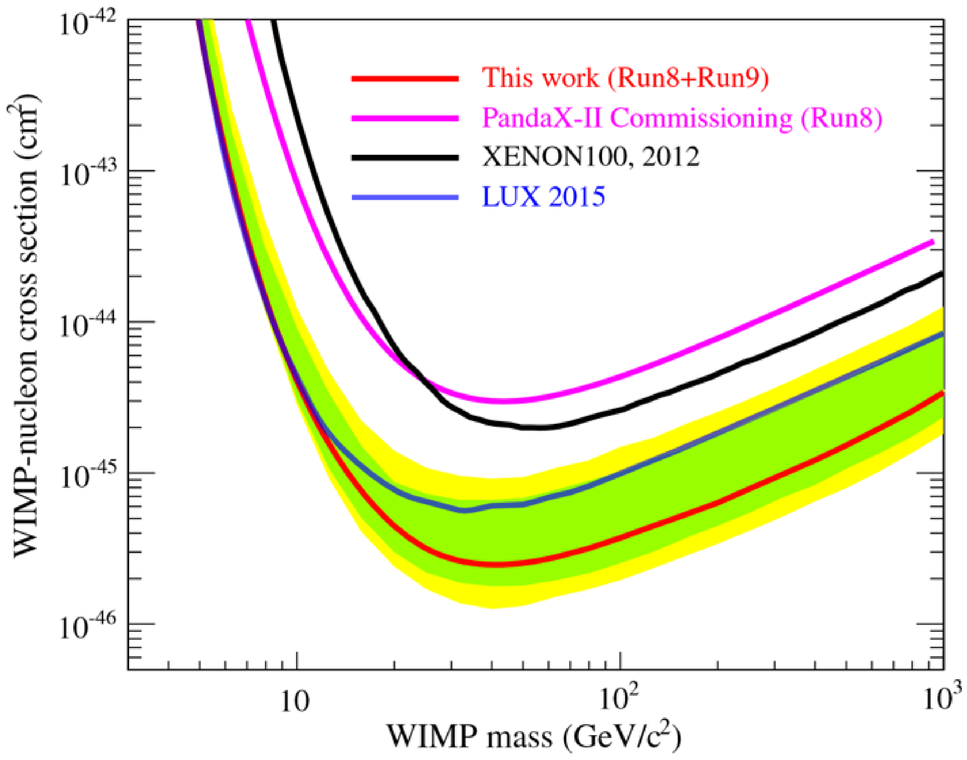
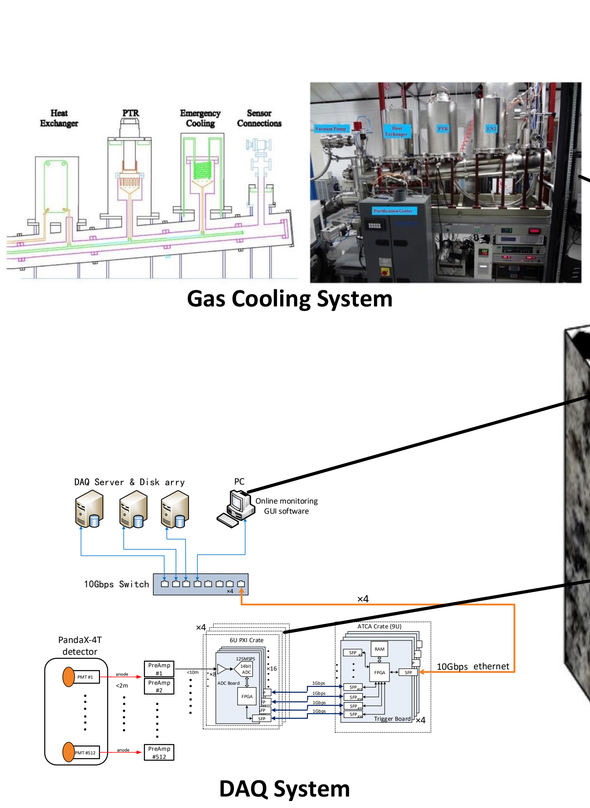
Abstract

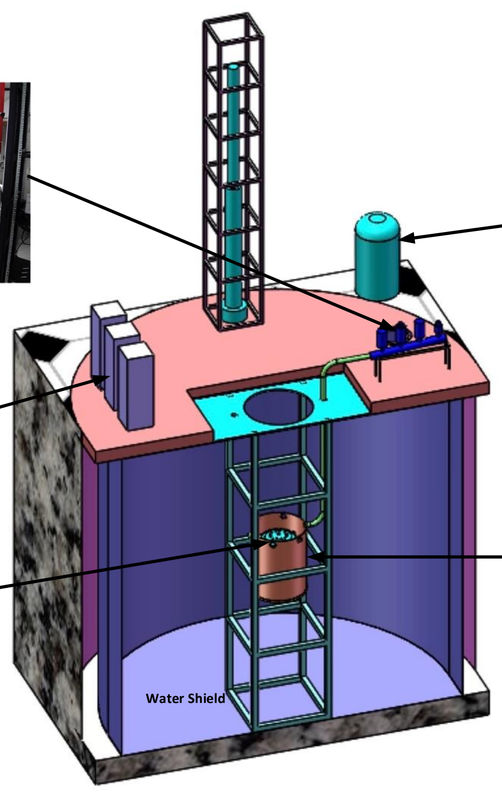
The PandaX-4T(Particle AND Astrophysical Xenon phase IV) project is a dark matter direct detection experiment with dual-phase xenon located in the China JinPing Underground Laboratory phase-II(CJPL-II). As the result of 120kg PandaX-I has been released in May 2015 and the 500kg PandaX-II will stop data taking in 2018, the upgraded experiment, PandaX-4T, will contain 4 tons of xenon in the sensitive volume and we hope it will set the more stringent limit for WIMP.

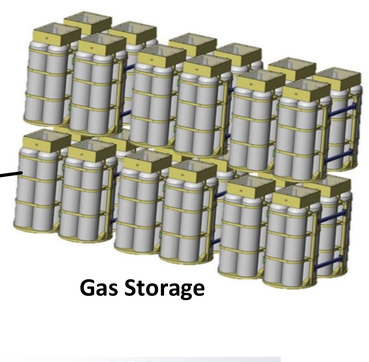
PandaX-II experiment result

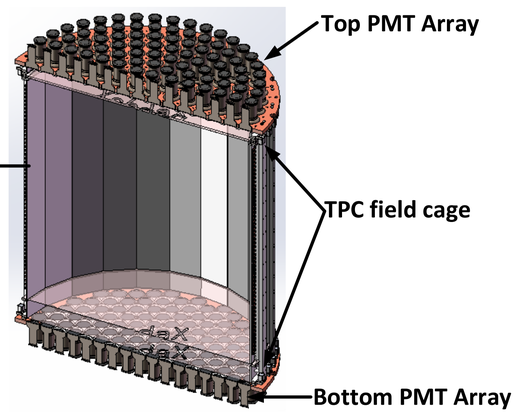


PandaX-4T Expriment Design



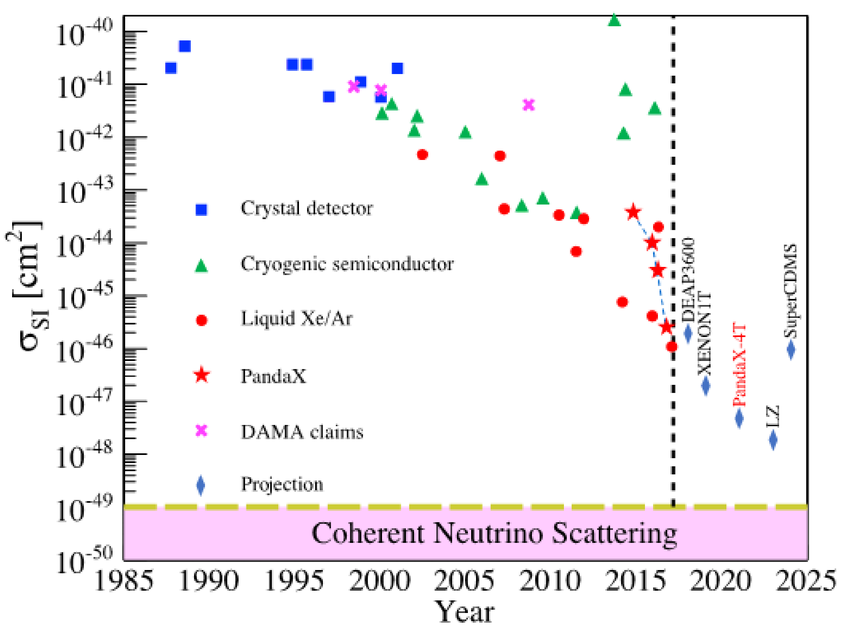


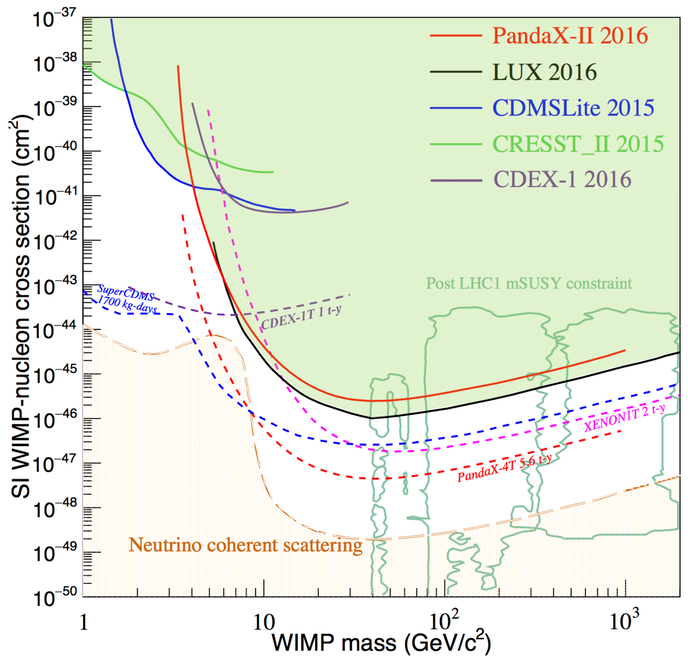




- Detector TPC: 1.2m drift length
- Drift voltage: 800V/cm
- Fiducial volume Xenon: ~4T
- Detector shield: <0.05mDRU
- Signal collection: 368 3-inch PMT and 144 1-inch veto PMT
- ~6T Xenon gas purification, cooling and storage system
- DAQ system: realtime data suppression and triggerless data taking

PandaX-4T Expected Sensitivity





With a 5.6 ton-year exposure, the sensitivity to spin-independent WIMP-nucleon cross section limit is expected to reach $10^{-47}cm^2$, more than one order of magnitude lower than the current PandaX-II limit. The sensitivity of the PandaX-4T experiment, together with current leading exclusion limits, the mSUSY contour, and the ultimate neutrino "floor". This experiment will also be a critical technology demonstrator for the next stage PandaX-xT detector.

References

[1] Andi Tan et al. Dark matter results from first 98.7 days of data from the pandax-ii experiment. *Physical Review Letters*, 117(12):121303, 2016.

[2] Andi Tan et al. Dark matter search results from the commissioning run of pandax-ii. *Physical Review D*, 93(12):122009, 2016.

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