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New results from the XENON10 direct dark matter search

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The XENON10 experiment is a search for Weakly Interacting Massive Particles (WIMPs), a leading candidate for the dark matter content of the Universe. The XENON10 detector uses the simultaneous measurement of ionization and scintillation in liquid xenon to distinguish between nuclear recoils and background electronic interactions. Ionization electrons are extracted into the xenon vapor where they produce a large proportional scintillation signal in a grid assembly. Both prompt and proportional scintillation light are detected by PMT arrays on the top and bottom of the active liquid xenon volume. The distribution of proportional scintillation light in the top PMT array can be used to achieve xy position resolution, while the ionization drift time gives position resolution in the z direction. This allows the definition of a low-background fiducial volume. XENON10 was installed in the underground Gran Sasso National Laboratory in Italy in March 2006, and a blind analysis was performed on low-background data acquired between November 2006 and February 2007. I will present the results of that analysis, which has the allowed the most sensitive limit to date on the spin-independent WIMP-nucleon scattering cross-section. I will also describe the current plans for XENON10, as well as future dark matter experiments using the same technology.

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