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3D Event Position Reconstruction in the XENON10 Dark Matter Detector[1] ROBERTO SANTORELLI, Columbia University, XENON COLLABORATION — XENON10 is a 15-kg dual phase xenon TPC (Time Projection Chamber) whose aim is to search for dark matter WIMPs (Weakly Interacting Massive Particles). The detector's 3D-position sensitivity enables a good reduction of the gamma-induced background rate, by rejecting events localized near the edges and the surfaces of the sensitive volume. A X-Y position reconstruction algorithm based on a Neural Network (NN) technique has been developed in order to improve event localization, especially near the edges of the sensitive volume. The performance of the NN algorithm has been tested and shown to be superior than that achieved with an algorithm based on a χ^2 minimization of the differences between real events and a map of Monte Carlo (MC) simulated events. The results from gamma calibration data (Cs-137 source and background) and MC events show that the NN method provides better position resolution and a better edge events identification than the previous method.

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