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Water Cherenkov detector of the JUNO Veto System

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The Jiangmen Underground Neutrino Observatory (JUNO) is a 20 kton liquid scintillator detector with primary physics goal of neutrino mass hierarchy determination and other measurements, including precise neutrino oscillation parameters, solar neutrino, geo-neutrino, supernova neutrinos and the diffuse supernova neutrinos background. The detector will be built in 700m deep underground laboratory. A multi-veto system will be built for cosmic muon detection and background reduction. The outer of the central detector is filled with water and equipped with ~ 2400 MCP-PMTs (20 inches) to form a Water Cherenkov Detector for muon tagging. Both around the water Cherenkov detector and the central detector external surface are coated with Tyvek reflector to increase the light collection efficiency. The muon detection efficiency is $>95\%$ for Water Cherenkov Detector. With this veto system, the cosmic muon induced fast neutron background can be reduced at the level of $\sim 0.1/\text{day}$.

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