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P1.078 The design of the JUNO veto system

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The Jiangmen Underground Neutrino Observatory (JUNO) is a multipurpose 20 kton liquid scintillator detector. The detector will be built in a 700m deep underground laboratory, and its primary physics goal will be to determine the neutrino mass hierarchy. Due to the low background requirement of the experiment, we design a multi-veto system for cosmic muon detection and background reduction. The volume outside the central detector is filled with pure water and equipped with 2000 MCP-PMTs (20 inches) to form a water Cherenkov detector for muon tagging. Both the wall and the central detector surfaces are coated with Tyvek reflector to increase light collection efficiency. To keep a good water quality-including Radon control- we employ a circulation/polishing water system. A Top Tracker (TT) system will be built by re-using the Target Tracker walls of the OPERA experiment and will cover half of the top area. The TT consists of 62 walls made of plastic scintillator strips equipped with WLS fibres, with dimension 6.8m*6.8m each, and allow x-y readout for precise event position measurements. The three layer structures of the TT with its appropriate trigger electronics will reduce background rate at an acceptable level and will perform a precise muon tracking. This will provide valuable information for cosmic muon induced Li9/He8 study. The muon detection efficiency is expected to be >95% for water Cherenkov detector. The cosmic muon induced fast neutron background can be controlled at 0.1/day. This poster will present the preliminary design of the two veto systems.