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The Electronics Simulation Software in JUNO

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The Jiangmen Underground Neutrino Observatory (JUNO), located in Southern China, is a multi-purpose neutrino experiment that consists of a central detector, a water Cherenkov detector and a top tracker. The primary goal of the experiment is to determine the neutrino mass ordering (NMO) and precisely measure neutrino oscillation parameters. The central detector contains 20,000 ton liquid scintillator and is instrumented with 17,612 20-inch PMTs and 25,600 3-inch PMTs for anti-neutrino detection with an energy resolution of 3% at 1MeV. The electronics simulation is the crucial module of JUNO offline software (JUNOSW). It takes the photoelectron information from Geant4 based detector simulation as input to simulate the PMT response, trigger logic and electronics response of sub-detectors using an implementation based on SNiPER managed dynamically- loadable elements(DLE). Electronics simulation incorporates a "hit-level" event mixing implementation which combines different event types with different rates that mimic the data streaming of real experimental data. The event mixing uses a "pull"based workflow using SNiPER incident schema. The electronics simulation outputs become inputs to the online event classification algorithms (OEC) used for event tagging and then saved to file using ROOT I/O services. In this talk, a detailed introduction of the electronics simulation software will be presented.

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