

Preliminary design study for Jinping neutrino experiment

Jinping underground neutrino experiment kton-detector will be built in the future. We use the simulation software —Jinping Simulation Analysis Package(JSAP) based on Geant4 for simulating and optimizing the kton-detector structure. Each part of the detector is likely to have uranium, thorium, potassium or radon radioactive isotopes, which will be our background. Based on some simulations, we learned that some components of high radioactive elements is the main source of background, and found that radioactive background will be reduced by an order of magnitude due to 0.5-meter water shield. Therefore, kton-detector preliminary structure is as follows. The center of the detector is a spherical inner acrylic vessel filled with slow liquid scintillator with 11-meter radius and surrounded by pure water. Photomultiplier tubes are settled between 13 and 14 meters from the center, and supported by low radioactive stainless steel frame. The outermost layer of detector is a cylindrical low radioactive stainless steel tank with 30 m in both diameter and height . We imported radioactivity measurements for different materials from SNO and Borexino experiments, and then estimated the kton-detector background produced by the radioactive isotopes of the detector material. We find the solar neutrino signals are significant at this background level.

Primary author: Mr LUO, Wentai (University of Chinese Academy of Sciences)

Presenter: Mr LUO, Wentai (University of Chinese Academy of Sciences)