Low Radioactivity Techniques (LRT2022)



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Background measurements for Jinping Neutrino 1-t prototype at CJPL

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In 2017-2020, Jinping Neutrino 1-t prototype has detected numerous MeV radioactive background events, 343 high energy muon events and muon induced neutrons. By Bi-Po coincidence, the U238 contamination of liquid scintillator (LS) is measured as $(6.98 \pm 0.73) \times 10-13$ g/g, and Th232 upperlimit is $3.7 \times 10-13$ g/g (95% C.L., preliminary). On PMT glass, K40 contamination is $(5.73 \pm 0.79stat. \pm 1.49sys.) \times 10-8$ g/g and Tl208 event rate is $(3.86 \pm 0.26stat. \pm 0.85sys.) \times 10-3$ Bq/g, indicating $(2.64 \pm 0.18stat. \pm 0.58sys.) \times 10-6g/g$ Th232. The radioactivity of LS will be further suppressed after the distillation system is online. The muon flux is $(3.61 \pm 0.19stat. \pm 0.10sys.) \times 10-10$ cm⁻²s⁻¹ with an average energy of 340 GeV, and its neutron yield is $(3.44 \pm 1.86stat. \pm 0.76syst.) \times 10-4-1g-1cm2$. Those results indicates that CJPL is an ideal place for low background experiments. We are making steady progresses on lowering radioactive isotopes of detector materials.

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