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Jinping, and the solar neutrinos

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The expected transition from matter effect to vacuum oscillation in solar energy spectrum, or the solar spectral 'upturn' towards low energy region, has not been observed yet, leaving space for non-standard neutrino interactions as well as light sterile neutrinos.

Jinping neutrino experiment is a proposed 2 kiloton fiducial mass slow liquid scintillator detector located in China Jinping Underground Laboratory.

The deep overburden of 6,720 w.m.e. and extremely low muon rate at $(2.0 \pm 0.4) \times 10^{-10}/(\text{cm}^2 \cdot \text{s})$ at Jinping enables background-free detection from the spallation product ¹¹C, which overlap with the crucial transition region of 1-3 MeV.

The energy response of scintillation light is not linear at low energy, requiring strict nonlinearity correction for neutrino energy reconstruction.

A fast detector response model is thus presented, which fits a minimal set of physically-motivated parameters that capture the essential processes of detector response and naturally account for changes in scintillator characteristics over time, helping to avoid associated biases or systematic uncertainties.

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