Contribution ID: **246** Type: **Poster**

CONNIE: A low-energy experiment with reactor neutrinos

The Coherent Neutrino-Nucleus Interaction Experiment (CONNIE) uses fully depleted high-resistivity CCDs (Charge Coupled Devices) to detect the coherent elastic neutrino-nucleus scattering (CEνNS) of reactor antineutrinos with Silicon nuclei and probe physics beyond the Standard Model. CONNIE is located at a distance of 30 m from the core of the 3.8 GW Angra-2 nuclear reactor, in Brazil. Since its 2016 upgrade, the experiment has operated with a noise level of less than 2 e RMS and an active mass of 50 g. The analysis of the 2016-2018 data allowed to set a 95% C.L. upper limit on the CEνNS rate. This result was used to restrict simplified extensions of the SM involving light mediators imposing the best limits between experiments looking for CEνNS for low-mass mediators. Here, we report on CONNIE's performance over the past 4 years, the finalized blind analysis of the 2019 data featuring a lower energy threshold (50 eV), and prospects for using Skipper-CCDs to observe CEνNS in nuclear reactors.

Working group

WG6

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Session Classification: Poster session NB: do not use Safari; use Firefox, Chrome or Edge