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Results on coherent elastic neutrino-nucleus scattering from the CONNIE experiment

The Coherent Neutrino-Nucleus Interaction Experiment (CONNIE) uses fully depleted high-resistivity CCDs (charge coupled devices) as particle detectors with the goal of measuring the coherent elastic scattering of reactor antineutrinos with silicon nuclei and probing physics beyond the Standard Model. The experiment is located at a distance of 30 m from the core of the 3.8 GW Angra 2 nuclear reactor in Angra dos Reis, Brazil. Since its upgrade in 2016, the experiment has been operating with very low noise of less than 2e- RMS and an active mass of 50 g. The results of the analysis of 2016-2018 data helped constrain two simplified extensions of the Standard Model with light mediators. A 95% confidence level limit was established and the constraints on the neutrino rate for a light vector with mass $MZ' < 10$ MeV and a light scalar with mass $M\phi < 30$ MeV are the current best limits among the experiments searching for coherent elastic neutrino-nucleus scattering. Here, we report on the performance of the CONNIE detector during the past 4 years of operation, the blind analysis of the latest 2019 data with a 50 eV energy threshold, and future perspectives of skipper CCDs for detecting CEvNS.

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