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Searches for CEvNS and BSM physics at CONNIE

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CONNIE (COherent Neutrino-Nucleus Interaction Experiment) utilizes high-resistivity silicon CCDs to measure coherent elastic neutrino-nucleus scattering (CEvNS) of reactor antineutrinos on silicon nuclei at the Angra-2 reactor in Brazil. In 2021, the setup was enhanced with two Skipper CCDs, pushing the sensitivity threshold to 15 eV and demonstrating the potential of Skipper CCDs in reactor neutrino detection. 300 days of data were acquired between 2021 and 2022, corresponding to a total exposure of 18.4 g-days. No significant excess was observed in the comparison of reactor-on and reactor-off data, leading to 95\% CL upper limits on CEvNS. I will present these results and discuss the capability of Skipper CCDs in three novel searches for new physics: constraints on neutrino interactions through light vector mediators, dark matter-electron scattering via diurnal modulation, and the detection of relativistic millicharged particles from reactors. Lastly, I will outline future plans to scale up the detector mass for enhanced sensitivity.

Author: AVALOS, Nicolás (Instituto Balseiro (Universidad Nacional de Cuyo, Comisión Nacional de Energía Atómica), CONICET)

Presenter: AVALOS, Nicolás (Instituto Balseiro (Universidad Nacional de Cuyo, Comisión Nacional de Energía Atómica), CONICET)

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