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Novel constraints on neutrino physics Beyond the Standard Model of elementary particles from the Conus and Conus+ experiments

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The CONUS experiment was located 17m from the core of the powerful nuclear power plant in Brokdorf (Germany) with the aim of detecting coherent elastic neutrino nucleus scattering ($\text{CE}\nu\text{NS}$) from reactor anti-neutrinos. The experiment ended operations in 2022 with the world-best limits on the detection of such events at nuclear reactors making way for the first detection of $\text{CE}\nu\text{NS}$ at a nuclear reactor by its successor CONUS+ (situated in Leibstadt, Switzerland) in 2025. The data provided by both the CONUS and CONUS+ experiments proves to be extremely valuable for analyses of Beyond the Standard Model (BSM) effects, such as yet undetected neutrino channels and electromagnetic properties. In this talk new limits on BSM neutrino phenomenology from previously unanalyzed data from the CONUS experiment will be presented with an eye on the future analysis of the new CONUS+ data. Competitive bounds on vector NSIs as well as new light scalar and vector mediators are presented and put into the global context of efforts to find such new interactions.

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