

Bounds on new physics with data of the Dresden-II reactor experiment and COHERENT

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Coherent elastic neutrino-nucleus scattering was first experimentally established five years ago by the COHERENT experiment using neutrinos from the spallation neutron source at Oak Ridge National Laboratory. The first strong evidence of observation of coherent elastic neutrino-nucleus scattering with reactor antineutrinos has now been reported by the Dresden-II reactor experiment, using a Germanium detector. We present constraints on a variety of beyond the Standard Model scenarios using the new Dresden-II data. In particular, we explore the constraints imposed on neutrino non-standard interactions, neutrino magnetic moments, and several models with light scalar or light vector mediators. We also quantify the impact of their combination with COHERENT (CsI and Ar) data. In doing so, we highlight the synergies between spallation neutron source and nuclear reactor experiments regarding beyond the Standard Model searches, as well as the advantages of combining data obtained with different nuclear targets. We also study the possible signal from beyond the Standard Model scenarios due to elastic scattering off electrons and find more stringent constraints in certain parts of the parameter space than those obtained considering coherent elastic neutrino-nucleus scattering.

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