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Recent Progress on Understanding Neutrino Properties

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The new era of precision neutrino physics has given us access to several previously-unmeasured neutrino properties and allowed dramatically improved limits on others, including properties predicted by physics Beyond the Standard Model. Limits on as-yet-unmeasured Standard Model properties of neutrinos, like their masses, mass hierarchy, and CP-violating oscillation phase, have seen significant improvements in the last few years; next-generation experiments are expected to have the sensitivity needed to make conclusive measurements of some of these properties. Current and planned measurements of coherent elastic neutrino-nuclear scattering will allow us to measure or set limits on the neutrino magnetic moment and many varieties of non-standard interactions, and higher-sensitivity neutrinoless double-beta decay searches are probing the potential Majorana nature of the neutrino. Persistent tensions between short baseline measurements and the three-flavor oscillation model point to the exciting possibility of additional generations of neutrinos – or simply unresolved systematics in our measurements. Future precision measurements of neutrino and nuclear physics could hold the answer to this and other important questions.