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The HALO-1kT Supernova Neutrino Detector

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HALO-1kT is a proposed lead-based supernova neutrino detector for construction at the Laboratori Nazionali del Gran Sasso (LNGS) in Italy. It is an evolution of the successful, but smaller, HALO detector at SNOLAB. HALO-1kT is expected to outperform HALO by a factor of 25 in sensitivity. The scientific collaboration is Canadian-led with major participation by Italian and American groups. HALO-1kT is timely and possible due to the experience gained in the construction and operation of HALO at SNOLAB; the availability of 1000 tonnes of lead from the OPERA experiment and the enthusiasm at LNGS to re-invigorate their supernova detection capabilities; and the end of the American moratorium on the distribution of He-3 and its availability once again through the DOE Isotope Program. Neither HALO nor HALO-1kT can claim to be fully understood and calibrated until the neutrino-lead cross sections are known at supernova-relevant energies. A measurement of these cross sections at Oak Ridge National Laboratory's Spallation Neutron Source is part of the Collaboration's scientific objectives. An update on the project's status will be presented.

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