

SES07-2007-000033

Abstract for an Invited Paper
for the SES07 Meeting of
the American Physical Society

ν -SNS, A Neutrino Program at the Spallation Neutron Source

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During the past few years, outstanding progress has been made in our understanding of the neutrino properties. Recent results from neutrino experiments have conclusively shown that neutrinos undergo oscillations, that is they can change from one type of neutrino to another, and the fact that neutrinos do oscillate is indicative of the various neutrino species having non zero mass. However, there still remain many open questions regarding the role that neutrinos play in the various physical processes that occur in the Universe. One of these open questions is the role that neutrinos play in Supernova explosions. Neutrinos can carry away up to 99% of the total energy that is released during the core collapse. They thus affect the both the dynamics of the supernova explosion and the nucleosynthesis. To understand the role that neutrinos play during the supernova explosion, it is necessary to have precise knowledge of neutrino interactions with the nuclei at the low energy. The ν -SNS program at ORNL is directed toward accurately measuring the neutrino-nucleus cross section at supernovae neutrino energies for a wide range of nuclei.