

The Sudbury Neutrino Observatory: Observation of Flavor Change for Solar Neutrinos

A. B. McDonald, Queen's University, Kingston, Canada

The Sudbury Neutrino Observatory (SNO) was a 1,000 tonne heavy-water-based neutrino detector created 2 km underground in an active nickel mine near Sudbury, Canada. SNO has studied neutrinos from ^8B decay in the Sun and observed one neutrino reaction sensitive only to solar electron neutrinos and others sensitive to all active neutrino flavors. It found clear evidence for neutrino flavor change that also implies that neutrinos have non-zero mass. This requires modification of the Standard Model for Elementary Particles and confirms solar model calculations with great accuracy. The underground facility has been expanded by a factor of three in excavated volume and maintained ultra-clean throughout. This provides opportunities for future measurements that benefit greatly from the very low radioactivity environment, such as searches for Dark Matter and studies of further neutrino properties. Several of these major international experiments will be discussed.