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The Homestake Solar Neutrino Detection Experiment

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It is now a half century since Raymond Davis first announced his startling results –the observed flux of electron neutrinos from the Sun was much smaller than predicted by model. Of course, the most impressive early result of this experiment was that neutrinos emitted by the Sun were detected and that this signal was visible above the background. Over three decades this initial "discovery"observation evolved into a fairly precise, 5% statistical uncertainty, measurement. This observation had three impressive results, (1) it was the first detection of neutrinos from a non-terrestrial source, (2) it experimentally demonstrated that the Sun was powered by hydrogen fusion into helium, and (3) it provided the first indication that the electron neutrinos emitted by the Sun converted into other neutrino species during their flight from Sun to Earth.
This talk will review some of the steps and obstacles involved in carrying out this thirty year observation and the resulting conclusions.

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