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The Super-Kamiokande Gadolinium Project

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Supernova explosions in our galaxy may be rare, but supernovae themselves are not. On average, there is one ccSN somewhere in the universe each second. The neutrinos emitted from all of these ccSN since the onset of stellar formation have suffused the universe. We refer to this thus-far unobserved flux as the "relic"supernova neutrinos.
The flux of the supernova relic neutrinos is expected to be several tens per square centimeter per second. Theoretical models vary, but as many as five supernova relic neutrinos per year above 10 MeV are expected to interact in Super-Kamiokande. However, in order to separate these signals from the much more common solar and atmospheric neutrinos and other backgrounds, we need a new detection method.
Two years ago, the Super-Kamiokande Collaboration approved the SK-Gd project. It is the upgrade of the SK detector via the addition of water-soluble gadolinium (Gd) salt. Since then, we have been conducting many dedicated study and developments for deploying Gd to SK. This modification will enable it to identify low energy anti-neutrinos for the world's first observation of the relic supernova neutrinos via inverse beta decay.

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