



**Irfu**

Institut de recherche  
sur les lois fondamentales  
de l'Univers

**Séminaire  
DPhP**

**Lundi 13/11/2017, 11h00**

CEA-Saclay Bât. 141, salle André Berthelot

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## **Status of Super-Kamiokande Gd and a little about other projects in Kamioka**

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Super-Kamiokande (SK) will be upgraded to Super-Kamiokande Gd (SK-Gd) for enhancing the anti-neutrino detection. The main physics motivation is to detect Diffuse Supernova Neutrino Background (DSNB).

Supernova explosions in our galaxy may be rare, but supernovae themselves are not. On average, there is one core-collapse supernova somewhere in the universe each second. The neutrinos emitted from all of these supernovae since the onset of stellar formation have suffused the universe. The flux of the DSNB 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.

In 2015, 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. Gd has the largest cross-section for thermal neutron capture and emits a gamma cascade of about 8 MeV. This cascade is detected with much higher efficiency than the capture on protons that produces a single gamma of 2.2 MeV. To achieve this we have been conducting many developments from the various view points, such as environmental safety, both positive and negative impacts to physics program of Super-Kamiokande experiments. It is already decided that the current Super-Kamiokande phase IV will be stopped on June 1 2018 and the refurbishment of the detector will be started on the same day.

In this seminar, I will report about the ongoing studies for SuperK-Gd including SK refurbishments. Other R&D activities for dark matter experiments and Hyper-Kamiokande may also be mentioned.

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Le café sera servi 10 minutes avant.

NB : La présentation d'une pièce d'identité est exigée à l'entrée du centre. Tous les auditeurs extérieurs sont priés de prévenir à l'avance Martine Oger, tél. 01 69 08 23 50, e-mail : [martine.oger@cea.fr](mailto:martine.oger@cea.fr). (U.E. : délai de 24 h, hors U.E. : délai de 4 jours).