# Preparation of the Hyper-Kamiokande experiment for precise measurements of neutrino oscillation parameters

Date de mise en ligne : Tuesday 5 November 2019

- Thèses, Stages, Formation et Enseignement - Propositions de thèses 2020 -

**Title:** Preparation of the Hyper-Kamiokande experiment for precise measurements of neutrino oscillation parameters

**Supervisor:** Boris Popov

**Co-supervisor:** Mathieu Guigue

**Team:** Asymétrie Matière-Antimatière ; group T2K

**Description :**

Hyper-Kamiokande is a next generation long-baseline neutrino oscillation experiment that will be built in Japan. One of the main physics goals of the experiment is the discovery of CP violation in the lepton sector. Moreover Hyper-Kamiokande will be the most sensitive detector to proton decay and will be an observatory for neutrinos from astrophysical sources, such as supernovae neutrinos. The project has been recently approved in Japan and the construction will be launched in April 2020. The experiment will be based on a huge Water Cherenkov detector equiped with photomultiplies (PMTs) of different types: large 50'' PMTs developed by Hamamatsu (Japan) and so-called multi-PMT modules made of several small 3'' PMTs, currently being tested with the help of an existing water tank in Paris (Memphyno setup). The Hyper-Kamiokande detector will be exposed to an (anti)neutrino beam produced at the J-PARC accelerator. It will also register interactions of atmospheric and solar neutrinos. The physics part of the thesis will be mainly devoted to sensitivity studies for combined analysis of accelerator, atmospheric and solar neutrinos, informed by existing data from T2K and Super-Kamiokande experiments. The technical part of this work will be devoted to a design and construction of a clock distribution and synchronization system for PMTs. This system with prototypes developed at LPNHE can be tested within the Memphyno setup and in the framework of a planned test experiment at CERN.

**Work location:** LPNHE, Paris

**Possible trips:** Tokai (Japon) and CERN, Geneva

**Documentation:** http://www.hyperk.org

**Contacts :**


- Boris Popov, 33 (0)1 44 27 61 45
- Mathieu Guigue
- Jacques Dumarchez
- Claudio Giganti


 