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**Hadron production  
measurements with the  
NA61/SHINE spectrometer at  
CERN for precise prediction of  
(anti)neutrino fluxes in  
ongoing and future long  
baseline accelerator neutrino  
experiments**

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- Thèses, Stages, Formation et Enseignement - Propositions de thèses 2021 -

**Title:** Hadron production measurements with the NA61/SHINE spectrometer at CERN for precise prediction of (anti)neutrino fluxes in ongoing and future long baseline accelerator neutrino experiments

**Supervisor:** [Boris Popov](#)

**Co-supervisor:** [Jacques Dumarchez](#)

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

## Description :

The LPNHE neutrino group participates in the NA61/SHINE hadron production experiment at CERN which continues to collect data for precise (anti)neutrino flux predictions in future long baseline neutrino experiments, including the on-going T2K experiment as well as the next generation Hyper-Kamiokande (HK) project in Japan. The group is heavily involved in the T2K neutrino oscillation experiment which is finalizing the upgrade towards the second phase of the experiment, T2K-II, in order to improve constraints on the CP violation in the lepton sector. The next generation long-baseline neutrino oscillation experiment "Hyper-Kamiokande" will be built in Japan in the coming years. The detector will be exposed to the same (anti)neutrino beam produced at the J-PARC accelerator. Refined predictions of (anti)neutrino fluxes in T2K-II and HK using a new NA61/SHINE data taking campaign planned in 2021/2022 with a T2K replica target and their integration into the oscillation analysis are crucial for precise measurements of neutrino oscillation parameters and for the discovery of CP violation in the lepton sector. The successful candidate will participate in the collection and analysis of these NA61/SHINE data as well as in the integration of the corresponding results in the T2K-II oscillation analysis and in the calculation of expected HK sensitivity.

**Work location:** LPNHE, Paris

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

## Documentations:

- <http://www.hyperk.org>
- <http://shine.web.cern.ch/>
- <http://t2k-experiment.org/>

## Contacts :

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