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# Search for charge-parity (CP) violation in neutrino oscillations and upgrade of the T2K Near Detector

- Thèses, Stages, Formation et Enseignement - Propositions de thèses 2020 -  
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# Search for charge-parity (CP) violation in neutrino oscillations and upgrade of the T2K Near Detector

**Title:** Recherche de violation de charge-parité (CP) dans les oscillations de neutrinos et mise à niveau du détecteur proche de T2K

**Supervisor:** [Claudio Giganti](#)

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

## **Description :**

The T2K experiment is a long-baseline neutrino oscillations experiment, currently taking data in Japan. T2K has been the first experiment to detect the appearance of electron neutrinos in a muon neutrino beam and is currently searching for CP violation in the leptonic sector by precisely measuring appearance probabilities of neutrino and antineutrinos. Such measurement requires both, larger statistics and a better understanding of systematic uncertainties. In order to improve the latter, an upgrade of the T2K Near Detector, ND280, is being conducted and is expected to significantly reduce the impact of systematic uncertainties on T2K oscillation analyses. The ND280 upgraded detector is expected to start commissioning in 2021. In addition, the combination of T2K analyses with Super-Kamiokande and NOvA is being actively pursued by the collaboration. The PhD is funded by the ANR (Agence Nationale de la Recherche) and the PhD candidate will work on the upgrade of the T2K Near Detector investigating the physics capabilities of the upgrade in constraining neutrino cross-section models. In addition, he/she will analyse the existing data, with the goal of combining the T2K, SK, and NOvA oscillation analyses, boosting the sensitivity to both, CP violation and mass ordering.

**Work location:** LPNHE, Paris

**Possible trips:** J-PARC (Japon) et CERN, Geneva

**Documentation:** <https://t2k-experiment.org/>

## **Contacts:**

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