



ILANCE Internships Spring / Summer 2025

University of Tokyo

<https://ilance.cnrs.fr/>

The Franco-Japanese laboratory, dedicated to the physics of the two infinities, benefits from an exceptional scientific and cultural environment.

An on-site laboratory in Japan, ILANCE brings together researchers, students, post-docs, engineers and technicians from CNRS and Japanese institutions. The laboratory is made up of French scientists for long-term stays in Japan and Japanese physicists. Individual research grants are awarded for postdoctoral stays or doctoral thesis. The laboratory will also aim to welcome and support French scientists for temporary stays in Japan. Based on the Kashiwa campus in the northeast of the city of Tokyo, the ILANCE laboratory permanently hosts scientists from CNRS laboratories and from four departments of the University of Tokyo namely, ICRR, Kavli IPMU, ICEPP and the School of Science.

Search for non-unitarity of the PMNS matrix in the neutrino sector with T2K and Hyper-Kamiokande experiments.

For the very first time, we now have the possibility of measuring the possible violation of CP symmetry in the lepton sector through the oscillation of neutrinos, and through this, of proposing the very first brick explaining the asymmetry between matter and antimatter that we observe in our current universe. In this perspective, the current T2K experiment, and the future Hyper-Kamiokande, are the experiments best placed to realize this fundamental discovery. However, the parameterization (known as PMNS) currently used in neutrino experiments limits the universality of this discovery, as well as possible physics tests beyond the standard model. This subject proposes to rewrite the neutrino oscillation algorithm used in T2K and Hyper-Kamiokande considering a non-unitarity of the PMNS matrix, then to apply the result to the data collected by T2K since 2011 for the first time. This result will constitute a first physics search beyond the standard model by this method in T2K, as well as obtaining universal results on the violation of CP symmetry.

<https://www-sk.icrr.u-tokyo.ac.jp/en/hk/>

<https://t2k-experiment.org/fr/>

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https://fr.wikipedia.org/wiki/Michel_Gonin