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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ID[[1]](#footnote-2): | Title: Characterization of the upgraded J-PARC neutrino beam for T2K-II and HK experiments | | | | | | | | | | | | |
| PIs: **Members:** | **French Group** | | | | | | | **Japanese Group** | | | | | |
| name (Family name, First name) | | | **title** | | **lab.[[2]](#footnote-3)** | | **name**  (Family name, First name) | | | **title** | | **lab.[[3]](#footnote-4)2** |
| Popov Boris  e-mail: popov@lpnhe.in2p3.fr | | | Dr | | LPNHE | | Sakashita Ken  e-mail: kensh@post.kek.jp | | | Prof | | KEK |
| Dalmazzone Claire | | | PhD | | LPNHE | | Nakadaira Takeshi | | | Prof | | KEK |
| Giganti Claudio | | | Dr | | LPNHE | | Nishimori Sakiko | | | PhD | | KEK |
| Guigue Mathieu | | | Dr | | LPNHE | | Koshio Yusuke | | | Prof | | Okoyama Univ |
| Russo Stefano | | | Dr | | LPNHE | | Shiraishi Yuki | | | PhD | | Okoyama Univ |
| Voisin Vincent | | |  | | LPNHE | | Megan Friend | | | Prof | | KEK |
|  | | | | | | | | | | | | | |
| **Funding Request from France** | | | | | | | | | | | | | |
| **Description** | | | **€/unit** | | | | **nb of units** | | total (€) | requested to[[4]](#footnote-5) | | | |
| Visit to Japan | | | 150/day | | | | 20 days | | 3000 | IN2P3 | | | |
| Travel | | | 1500 | | | | 2 travel | | 3000 | IN2P3 | | | |
|  | | |  | | | |  | |  |  | | | |
| Total | | |  | | | |  | | 6000 |  | | | |
| **Funding Request from Japan** | | | | | | | | | | | | | |
| **Description** | | | **k¥/Unit** | | | | **nb of units** | | **total (k¥)** | requested to[[5]](#footnote-6)3 | | | |
| Visit to France | | | 20/day | | | | 20 days | | 400 | KEK | | | |
| Travel | | | 150 | | | | 2 travels | | 300 | KEK | | | |
|  | | |  | | | |  | |  |  | | | |
| Total | | |  | | | |  | | 700 |  | | | |
|  | | |  | | | |  | |  |  | | | |
| **Additional Funding from France** | | | | | | | **Additional Funding from Japan** | | | | | | |
| **provided by/requested to[[6]](#footnote-7)4** | | **Type** | | | **€** | | **provided by/requested to[[7]](#footnote-8)4** | | | **Type** | | **k¥** | |
| IN2P3 AP | |  | | | 31000 | | JSPS | | | travel | | 140 | |
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| Total | |  | | |  | | Total | | |  | |  | |

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| **Summary**  **Of**  **2024**  **Project** | In 2024 we will continue our very successful joint France-Japan project with the main goal of improving our knowledge on the upgraded (anti)neutrino beam produced at J-PARC for T2K-II and HyperKamiokande (HK) experiments. After the important J-PARC neutrino beamline upgrade, it restarted the operation at the end of 2023 achieving the record beam power of 760kW. Moreover, operation with a horn current set at 320kA (instead of 250kA used previously) is now tested. In 2024 at least two physics data-taking periods are planned.  The measurements of hadron yields from the surface of the T2K target performed with the upgraded NA61/SHINE spectrometer at the CERN SPS are crucial for detailed characterization of the J-PARC neutrino beam and already allowed to achieve unprecedented precision on flux uncertainties. New data (180M triggers compared to 10M used previously) collected during the 2022 are currently being calibrated and analyzed by a joint team of Japanese and French physicists. In 2024 we plan to finalize the calibration of the raw data and to start the analysis efforts.  In 2024 we also plan to finalize the design of the new time synchronization system being developed for the J-PARC neutrino beam by the joint French-Japanese team. Some additional stability tests would have to be performed on the J-PARC site. A free-running rubidium atomic clock accompanied by a set of GNSS antenna and receivers will be installed at J-PARC, characterized and maintained.  In 2024 we also plan to prepare a publication devoted to the results of the new HyperKamiokande sensitivity studies. |
| **Satellite meeting at annual workshop** | The group meets regularly on the occasion of NA61/SHINE, T2K and HK collaboration meetings. We also organize dedicated Zoom meetings in order to discuss the ongoing activities and to define plans for the future. In-person workshops are also being scheduled, if needed. |
| **Articles, conference talks & posters related to the TYL project** | Development of a Clock Generation and Time Distribution System for Hyper-Kamiokande, [Lucile Mellet](https://inspirehep.net/authors/1881201), [Mathieu Guigue](https://inspirehep.net/authors/1391600), [Boris Popov](https://inspirehep.net/authors/992965), [Stefano Russo](https://inspirehep.net/authors/1948198),[Vincent Voisin](https://inspirehep.net/authors/2056517), 2023, *Phys.Sci.Forum* 8 (2023) 1, 72; DOI: [10.3390/psf2023008072](https://doi.org/10.3390/psf2023008072)Updated T2K measurements of muon neutrino and antineutrino disappearance using 3.6x1021 protons on target, T2K Collaboration, K.Abe et al, 2023, *Phys.Rev.D* 108 (2023) 7, 072011; DOI: [10.1103/PhysRevD.108.072011](https://doi.org/10.1103/PhysRevD.108.072011)Addressing the challenge of neutrino interaction uncertainties in Hyper-Kamiokande , C.Dalmazzone (for HK collaboration), talk at the NNN’2023 conference, October 2023 |
| **Jointly Supervised Students** |  |
| **Comment related to IRL TYL & ILANCE** |  |

1. ID: If program continuation, use previous ID; if new project, ID will be set by the TYL directors; [↑](#footnote-ref-2)
2. e.g. LAPP/IN2P3, Irfu/CEA, IPNS/KEK, etc.

   3 IN2P3, Irfu or KEK

   4 e.g. French Embassy, other CNRS or CEA programs, PICS, European grants, JSPS, RIKEN, Universities ….; [↑](#footnote-ref-3)
3. 22 [↑](#footnote-ref-4)
4. [↑](#footnote-ref-5)
5. 33 [↑](#footnote-ref-6)
6. 44 [↑](#footnote-ref-7)
7. 44 [↑](#footnote-ref-8)