

Recommendation by the Panel for the future J-PARC Neutrino program

2019/7/24

Preamble

The Panel for the future J-PARC neutrino program was formed with a letter to the KEK DG from the accelerator-based neutrino community at J-PARC written on February 8, 2019. The mission of the panel is to recommend a strategy for the future neutrino program at J-PARC.

Recommendation

The Hyper-K project, consisting of the Hyper-K detector, J-PARC neutrino beam, and near detectors, is aiming to discover CP violation and to precisely determine the CP phase in a wide parameter space, together with various other physics programs. The Hyper-K target beam power is 1.3 MW and its near detector should provide the understanding of neutrino interactions required for the Hyper-K physics goal.

T2K is a running experiment aiming to discover CP violation in the case that CP symmetry is maximally violated. T2K proposes a beam time extension up to 20E21 POT.

The panel discussed the optimum strategy in the era from T2K to Hyper-K. Both the continuation of physics data taking in T2K and the upgrade of the beam power and near detectors for Hyper-K are important for the progress of the J-PARC neutrino program. If the Hyper-K project is approved, we recommend beam operation for the beam power upgrade and the T2K physics program at least up to 10E21 POT in total in parallel to the hardware upgrades of the accelerator and near detectors for Hyper-K. The continued operation enables a 3σ search for CP violation in the case of maximal CP violation when added to the existing T2K data, as well as neutrino interaction studies by the upgraded T2K near detector to be installed in 2021. This operation is also essential to achieve the timely beam power upgrade and sufficient systematic error control for the Hyper-K project. T2K beam time should be allocated to take place as early as possible in order to make impactful contributions to and steady progress in neutrino physics.

Panel members

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- C. K. Jung (State University of New York at Stony Brook , USA)
- T. Kobayashi (KEK, Japan)
- A. Konaka (TRIUMF, Canada)
- T. Nakaya [chair] (Kyoto University, Japan)
- F. Sanchez (University of Geneva, Switzerland)
- K. Sakashita (KEK, Japan)
- Y. Sato (KEK, Japan)
- M. Shiozawa (ICRR, University of Tokyo, Japan)
- D. Wark (Oxford University& STFC Rutherford Appleton Laboratory, UK)
- M. Zito (IRFU, CEA Saclay, Saclay, France)



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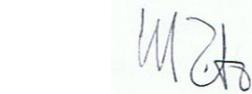
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Observers

T2K EC members

HK iSC members

M. Friend [Science secretary] (KEK, Japan)

T. Koseki (KEK, Japan)

Y. Kurimoto (KEK, Japan)

Appendix: The letter to KEK DG about the Panel for the future J-PARC Neutrino program



8 February 2019

Dear Prof. Yamauchi, Director General of KEK.

We, the accelerator-based neutrino community, would first like to say that we appreciate your continuous support on the neutrino program at J-PARC that KEK has provided. We desire to pursue long baseline experiments in the coming twenty years using J-PARC. The coming ten years will be a transition time between T2K and Hyper-Kamiokande: T2K is observing a hint for large CP violation and competing with NOvA, Hyper-K will be in the construction phase, and the J-PARC MR will be upgraded to achieve higher intensity. Although the community considers it very important to continue T2K data-taking while proceeding with the Hyper-K construction, we are told that the likely budget allocations would not be sufficient to conduct the full program in this transition period. In this situation we consider that it is important to have a place to discuss and recommend priorities among the J-PARC upgrade items and beamtime under possible budget scenarios. The development of a realistic long-term plan in the next decade is urgently needed to define our participation in the Japanese neutrino program. We would like to form a panel to discuss and recommend a strategy for the future neutrino program at J-PARC. People from T2K, Hyper-K and J-PARC accelerator and organization should be involved in the discussion. We would like to ask the director general to approve the formation of this panel and help guide the panel towards making the best strategy with your thoughtful inputs and possible conditions under some budget constraints. We hope that the benefits and risks evaluated by this process would provide important input to the decision-making process. We greatly appreciate your support for the fruitful future of the neutrino program in Japan.

Best regards,

Handwritten signature of T. Nakaya in black ink.

T. Nakaya, T2K Spokesperson,

Handwritten signature of M. Wascko in black ink.

M. Wascko, T2K International Co-Spokesperson

Handwritten signature of M. Shiozawa in black ink.

M. Shiozawa, Hyper-Kamiokande Project Leader

Handwritten signature of F. Lodovico in blue ink.

F. Lodovico, Hyper-Kamiokande Co-Project Leader