

Summary and prospects of physics group activities

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Physics WG activities

- Long baseline physics: J-PARC PAC and PTEP paper
- Extending physics program
 - Leptonic unitarity triangle
 - Sterile neutrino, lorentz violation
 - Earth spectrography
 - More ideas are WELCOME!
- “Optimization” of detector and design report

J-PARC PAC

- HK long baseline program presented at J-PARC PAC meetings (May and Dec 2014) → P58

From May PAC meeting report:

- The committee **recognizes the importance of the physics goals** of the experiment and supports detector and beam R&D. The committee **recommends that user support be given to scientists working on P58 R&D.**

From Yamauchi-san's talk at Dec. J-PARC PAC meeting

- P58: HyperKamiokande
 - KEK/IPNS and ICRR/U.Tokyo will exchange MOU to jointly carry out design of this experiment.
 - New review committee will be formed to review the design regularly. PAC will hear the report, but not be requested to approve it.

Hyper-K LOI submission to arXiv/PTEP

- J-PARC LOI is available on arXiv, arXiv:1412.4673
- Draft for PTEP is circulated to HK-WG
 - Will update according to received comments (all ones are minor, so far) within this week
 - Hope to submit (to PTEP and arXiv) as early as possible (next week??)
 - To follow “forming proto-collaboration” news
- If you still plan to read it and send comments, please do so ASAP
- Also please send update information of author list and acknowledgments

1 **Physics Potential of a Long Baseline Neutrino**
 2 **Oscillation Experiment Using J-PARC**
 3 **Neutrino Beam and Hyper-Kamiokande**

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 19 M. Jiang²⁶, K.K. Joo⁸, C.K. Jung^{49,56}, A. Kaboth¹⁷, T. Kajita^{55,56}, J. Kameda^{54,56},
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Near Future Plan

- **Design Report** to be prepared in 1 year
 - Optimized design, construction period/cost, organization
- **International review** under **KEK-IPNS/ICRR** to promote the project
- Start **budget request** in 2015~2016
- Masterplan 2017 → Roadmap 2017
- **Start construction** in 2018 → start operation in ~2025

It is critical time to promote the project

Towards design report

- For the forthcoming review and budget request, we need to consolidate our physics case
- We need to answer “why do you need this design?”
- Need to be able to defend key design parameters quantitatively based on physics studies
 - Photo coverage
 - Granularity of sensors
 - Fiducial mass
 - OD design
 - Necessary ND capability
 - ...

Study items (not a complete list)

- Long baseline
 - Requirements for near detectors
 - Explore more topics
- ATMPD
 - Sensitivity as a function of exposure
 - Explore more topics
- LOWE/astro
 - Define key goals and requirements on parameters
 - Sensitivity to #### as a function of parameter?
 - Explore more topics
- + Further optimization?
- Need cooperation with other WGs (software, ND, ...)

Notional Timeline

- 2015/1 **HK meeting**
- 2015/4–5 Cavity design ready

- 2015/6 Tank design ready
Selection of photo-sensor size and number

- 2015/7 **7th Hyper-K meeting?**
Fix the basic design of the detector
First rough draft ready

- 2015/9 Second draft ready
face-to-face meeting?

- 2015/10 submission to KEK/ICRR

We need to work hard..

**Will (re-)start regular physics WG meetings. ¹²
Please join!**