LoI to J-PARC PAC

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Some background

- Some of us had been discussing for a while submitting LoI to J-PARC PAC, to be officially recognized as a future program.
- At J-PARC PAC and T2K meetings, in Sep-Oct 2013, IPNS director asked future plan *beyond T2K* towards CPV.
- We decided to submit LoI to the next J-PARC PAC meeting (May 2014) to show our activity to J-PARC community.
  - As this is a document for J-PARC PAC, the contents will be focused on accelerator-based program. (outline will be shown later)
  - Include update since HK LoI; arXiv:1109.3262, Sep. 2011.
- MY was appointed as the editor (NOT single author).

M.Yamauchi, 17th J-PARC PAC meeting
"Mandate to the committee"

D. Review physics program in the near future (1)

- E11: T2K
  - Run plan in the post n_e era
  - Long range scenario to challenge CPV beyond T2K

- Experiments at high-p beam line
  - Beam line construction
    - Need design review
  - E16: electron pair spectrometer
    - Is there a realistic experimental plan?
    - Stage-2 request?
  - P50: charmed baryon spectroscopy
    - Answers to the homework will be presented.

J-PARC LoI, 2014: overview

- Focusing on accelerator ν (i.e. CP)
- Main update topics:
  - Physics context: θ_{13} now "fixed"
  - Latest detector design
  - Detector performance with HK software
  - Update of sensitivity with latest tools: fiTQun, combined fit of ν_μ&ν_e samples, more realistic systematic uncertainties (based on T2K experience)
  - Concept of near detectors

Timeline

- Deadline of submission: Apr. 14, 12:00 (JST).
- Draft to be ~ready by end of Feb.
- Then, contents/text will be internally reviewed and polished in Mar.
  - Minor update/correction can be done, but main contents are expected to be finalized at the end of Feb.

Section and editors

main text 40-50 pages?

1. Worldwide neutrino physics landscape in ~2020
   - Nakaya-san
2. Hyper-Kamiokande detector
   - Hide Tanaka
3. J-PARC accelerator and neutrino beam
   - TBA, from KEK/J-PARC
4. Near detectors and expected systematics
   - Mark Hartz
5. Physics sensitivity
   - Yokoyama

+ additional authors & reviewers for each section
(under discussion with editors+α)

Meetings

- ~1hr face-to-face discussion from 16:45 (just after the end of meeting) tomorrow
  - With section editors, authors and reviewers
  - Define outline and contents, schedule
- Regular editorial meeting (every ~2 weeks?)

J-PARC LOI summary

- Schedule is very tight, but..
  - Let's work efficiently to make the document
  - And show our activity to J-PARC (and to the world)
- Draft will be circulated to HK-WG ~the end of March
  - Author list to be defined
  - Deadline of submission to PAC is Apr. 14 (JST)

Additional material

1. Worldwide neutrino (oscillation) physics landscape in 2020

- General introduction of neutrino physics
- Landscape projection in ~2020
  - Expected results from T2K, NOvA, reactor,
  - Other planned experiments: LBNE, LBNO, …
- Positioning Hyper-K in the landscape

2. Hyper-Kamiokande detector

- Baseline detector design
  - Site, cavern, tank, water, sensor, DAQ, calibration,
- Expected performance
  - with HK software where available
- R&D status, readiness,
- possible alternative options under consideration

3. J-PARC accelerator and neutrino beam

- With KEK and J-PARC accelerator people
  - J-PARC accelerator people agreed to be author
- Prospects of accelerator/beamline power increase and expected performance
- Neutrino beam flux, uncertainties (here or next section)

4.Near detectors

- Requirements/goals of Near Detectors
- Near detector concepts under consideration
  - T2K ND280 detector (+Possible upgrade?)
  - 2km detector
  - nuPRISM
  - Any other?

5. Physics sensitivity

- Main focus on CPV
  - Other parameters and MH also mentioned (as in 2011 LOI)
- Sensitivity update with latest information
  - θ_{13} value
  - fiTQun π^0 rejection
  - HK specific software (if possible)
- Discussion of systematics
- Combination with atmospheric neutrino