

Summary of Hyper-K session

Session conveners: Francesca Di Lodovico, Masato Shiozawa, Masashi Yokoyama

- **Design Report** to be submitted by the HK proto-collaboration to KEK-IPNS / UTokyo-ICRR
 - Design, Physics, Organization, Cost to be clarified
- **HK Physics cases**
 - **Explore full ν osci. parameters** \rightarrow Precision measurements of δ ($\Delta\delta_{CP} \sim 10^\circ$), θ_{23} , Δm^2_{32} , Δm^2_{21} , $\theta_{12} \rightarrow$ Unitarity test, origin of CPV, test of exotic scenarios
 - **Extend nucleon decay searches** via many decay modes, e.g. $p \rightarrow e^+ \pi^0$ (gauge boson mediated, $\tau_{\text{proton}} \sim 10^{35}$ years @ 90% CL) and $p \rightarrow \nu K^+$ (SUSY favored, $\tau_{\text{proton}} \sim 3 \times 10^{34}$ years @ 90% CL)
 - **Astrophysical neutrino observatory**: Supernova in our galaxy and near galaxies, SRN, solar ν (^8B , day/night, upturn, Hep..)
 - many others (tau appearance, WIMP searches, n - \bar{n} oscillation,

Summary of questions

- Staging strategy is technically feasible?
 - Physics strategy after CPV discovery should be more studied
 - HK design optimum? → Tradeoff of volume and photon-yield
 - Daedalus? Super-KamLAND?, staging by adding other technology detectors?
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- **How can we ensure Hyper-K is ready for a possible different scenario in 2025? E.g.**
 - *T2Kmore* running and getting a hints of CPV?
 - MH not measured by then
 - **Non standard physics for Hyper-K**
 - Importance of this physics with respect to CPV/mixing?
 - What are the best models for a ~300km long baseline and off-axis beam?
 - **LowE/proton decay physics:**
 - Importance with respect to mixing physics?
 - How low in energy should we go for lowE physics?
 - **Relation with DUNE**
 - Should we actively work on common topics (accelerator, xsection..)?
 - Highlighting different potential of the experiments?
 - Other?