

Welcome and Introduction to Hyper-Kamiokande

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*Hyper-K Open Meeting
July 10, 2016*



Meeting goals

- The aim of the meeting is to identify areas of common interest and to explore ways to advance in those areas.
- This morning, a few talks will introduce the current status of the Hyper-Kamiokande experiment.
- It will be followed by a few dedicated sessions on specific R&D topics up to tomorrow afternoon, that in particular will focus on photosensors, test beams at CERN, electronics, calibration, software and physics tools.
- We will discuss at the end of the meeting how to move forward.

Hyper-K project

- **World-leading detector for nucleon decay and neutrino detection by an order of magnitude larger volume than the successful Super-K.**
- **Rich physics programs**
 - Comprehensive study of ν oscillations
 - Nucleon decay discovery potential
 - Unique ν Astrophysics
 - and more
- **Global project by international cooperations and participations**
- **Conceptual design ready→Full design with defined international responsibilities is necessary**

Hyper-K proto-collaboration

Inaugural Symposium@Kashiwanoha, January 2015

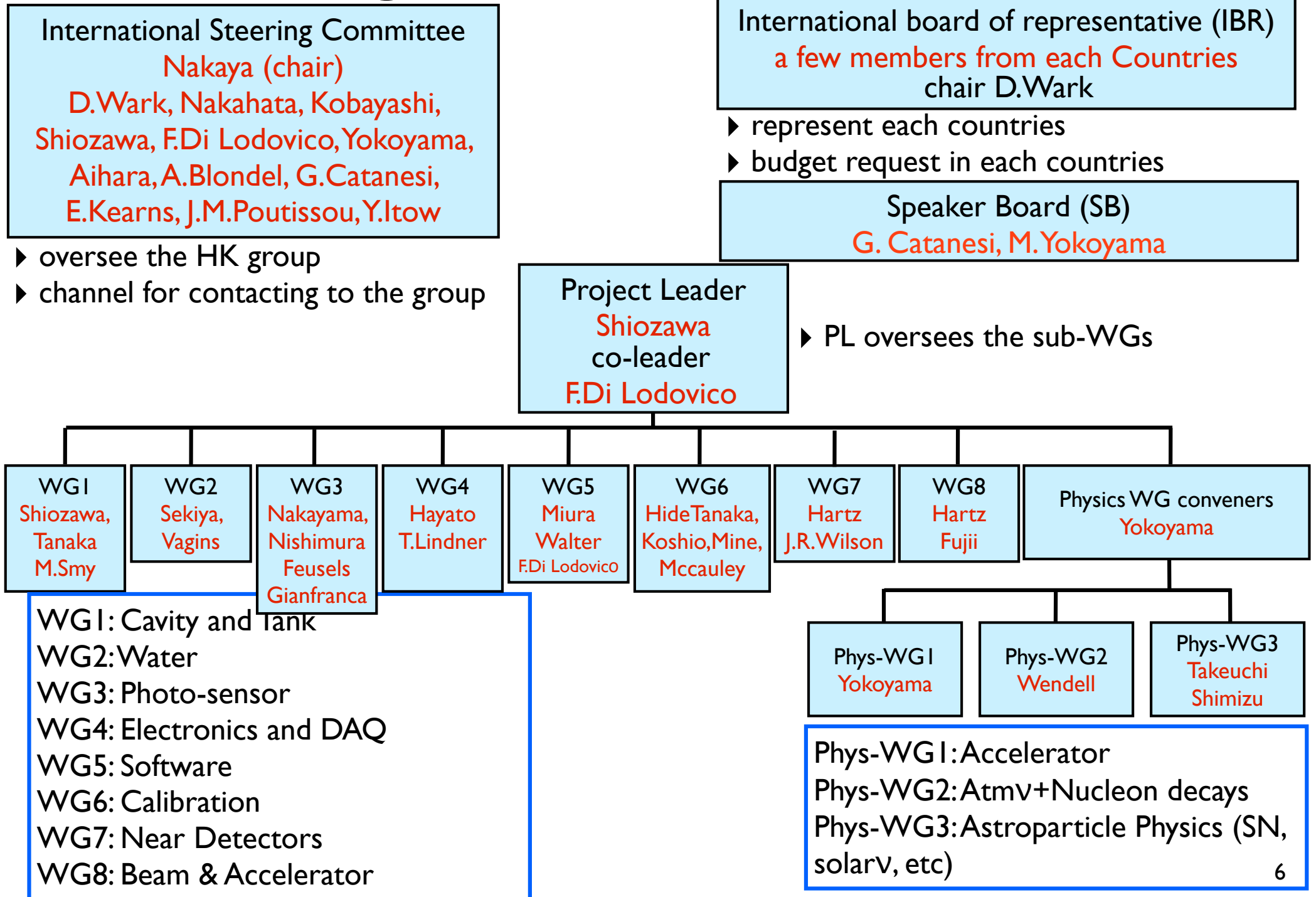


- **International Hyper-K group has been established**
 - International interests to the project
 - ~250 members, ~70% from abroad
- MoU between UTokyo/ICRR and KEK/IPNS
- Int. Hyper-K Advisory Committee has been launched.

(Incomplete) Steering Committee members w/ KEK DG and ICRR director

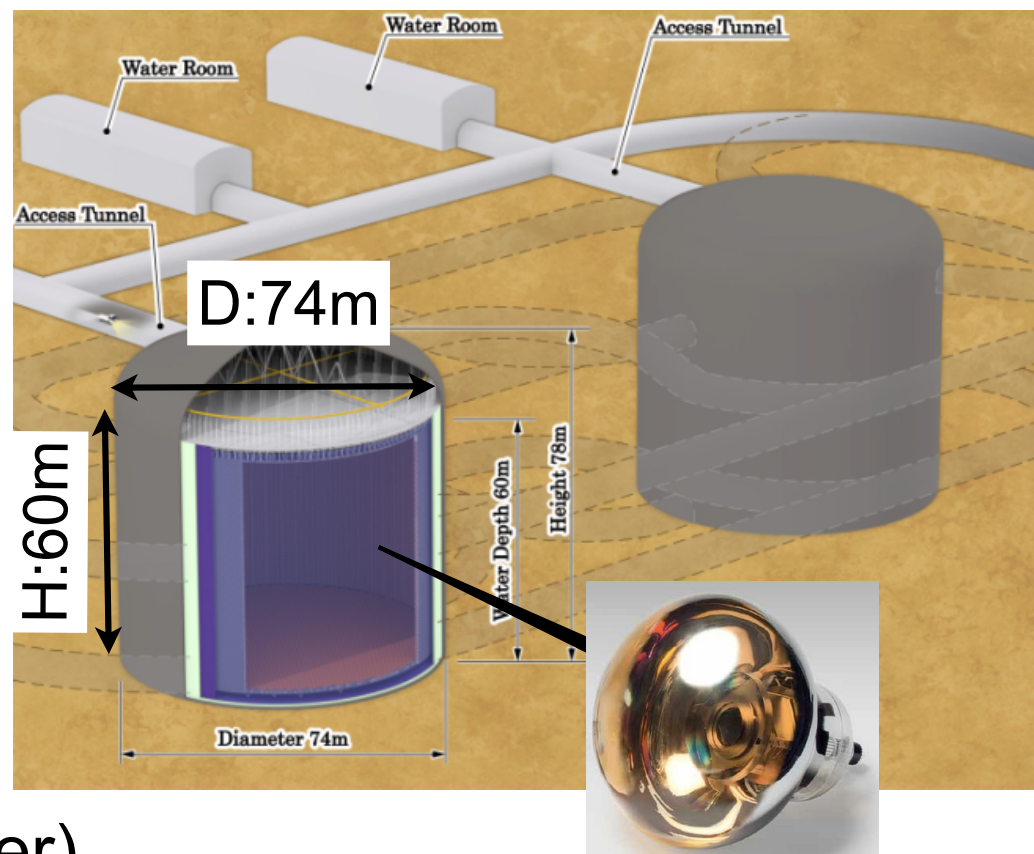
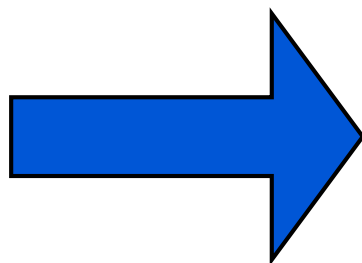
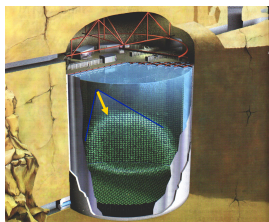


Organization Structure



Hyper-K detector

**Volume:
×10×2tanks**



- Vertical tank a la SK
- **2 Tanks with staging**

- 60m(Height)×74m(Diameter)

- 1 Tank: Total 260 kton

Fiducial volume(FV): 190 kton

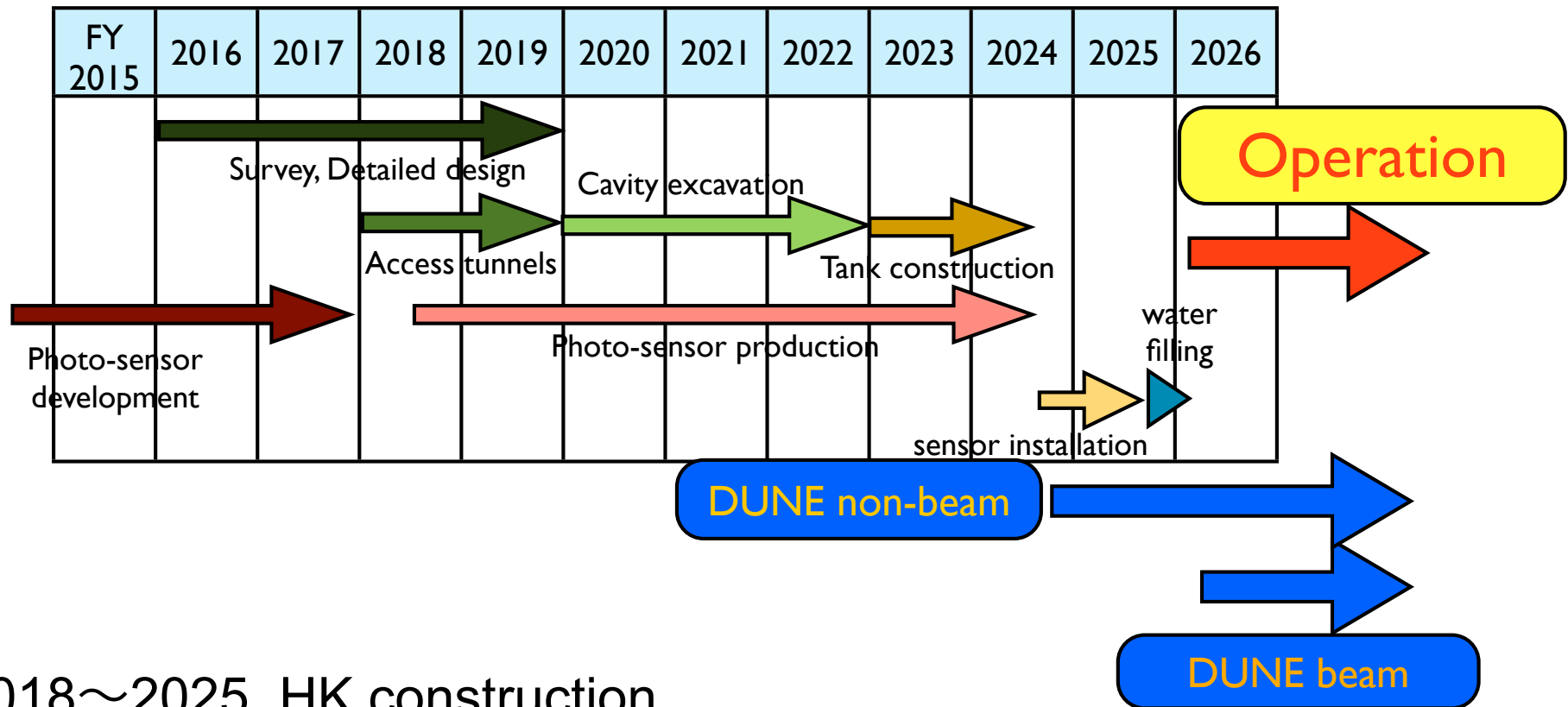
~10 x Super-K FV

~ 5 x DUNE

~ 5 x JUNO

- PMT coverage 40%, 40,000 ID-PMT, 6,700 OD-PMT

Notional Timeline (1st Tank)



- 2018~2025 HK construction
- 2026~ CPV study
Atm · Solar · Supernova v study, Proton decay searches

(Note) In the physics potential study, assumed are start of 2nd tank operation 6 years after the start of 1st tank.

Hyper-K International Contributions

- Minimal tank configuration is defined which could be built without significant international contributions but allows minimum physics goals: 1Tank + 20% photocoverage.
- International contributions are welcome to improve the experiment by innovative design, and other contributions from overseas.
- International contributions to increase the photocoverage to 40% will enable the full range of physics goals.
- International contributions to the accelerator are critical to achieving high neutrino intensity.
- International collaborators are expected to take a leading role in the near detector.

Possible foreign contributions

- Both in-kind and intellectual contributions are welcome.
- We are open to ideas toward a full design.
- **Cavity and structure**
 - contribution of innovative design and materials welcome, e.g. design of **PMT supporting structure**, **liner material** test and supply
- **Photosensors and PMT housing**
 - Innovative **ideas like multi-PMT module** supplied from oversea are welcome.
 - contribution of new design and materials for **PMT housing**
- **Electronics, DAQ, Calibration, Analysis software, Sensitivity study**
 - Area where foreign contributions are expected.
- **Other systems**
 - **outer detector** photon-detection system
 - **water purification/circulation system** (with Gd)
- **2nd Tank design and location**
- **Accelerator (J-PARC) and beam-line intensity upgrade**
- **Near detector upgrade with potential intermediate detector**