

Overview of Japanese strategy for High energy physics

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Member of CFP (Committee for future projects) of JAHEP

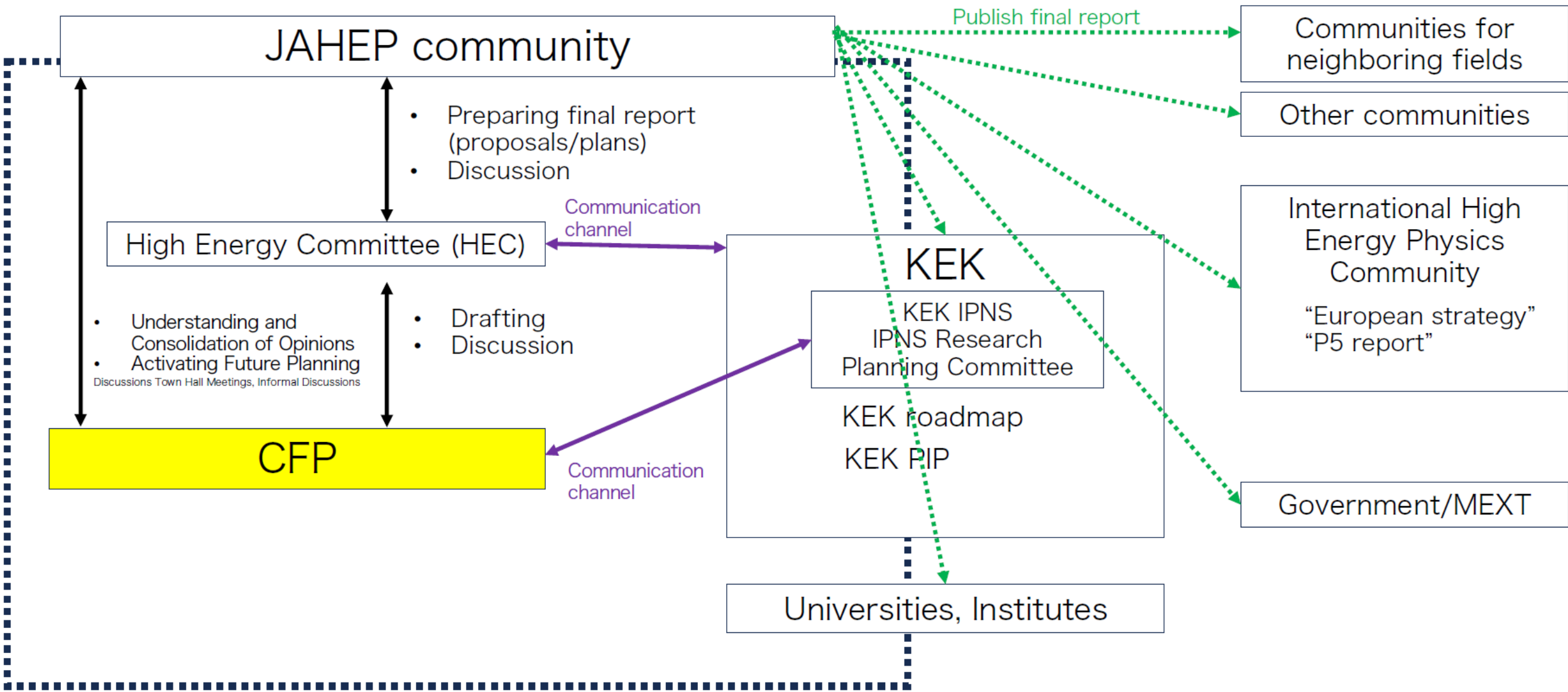
JAHEP and CFP

- JAHEP: Japan Association of High Energy Physics
 - Community for experimental particle physics in Japan
 - Website: <https://www.jahep.org/en/index.html>
 - 846 members (as of March 2024)
- High energy committee (HEC)
 - Executive board of JAHEP
 - 10 Members by election + a few ex-officio
 - Current chair: Tsuyoshi Nakaya (Kyoto U.)
- CFP: Committee for Future Projects
 - Nominated by High energy committee
 - 28 members (age < 50)
 - Incl. a few theorists and acc. Physicists
 - Renewed every 2 years (current: 2024-)

Members of 2024 CFP

2024.1~		
Yasuyuki OKUMURA	The University of Tokyo · ICEPP	Chairperson
Yoshinori ENOMOTO	KEK · ACCL	Secretary
Hideyuki OIDE	KEK · IPNS	Secretary
Kazuyuki SAKAUE	The University of Tokyo	Secretary
Tsunayuki MATSUBARA	KEK · IPNS	Secretary
Kazuki UENO	Osaka University	
Kenta UNO	KEK · IPNS	
Yuji ENARI	The University of Tokyo · ICEPP	
Hidetoshi OTONO	Kyushu University	
Shusei KAMIOKA	KEK · IPNS	
Ryuichiro KITANO	KEK · IPNS	
Takayuki KUBO	KEK · ACCL	
Koji SHIOMI	KEK · IPNS	
Taikan SUEHARA	The University of Tokyo · ICEPP	
Yu NAKAHAMA	KEK · IPNS	
Natsumi NAGATA	The University of Tokyo	
Koji TSUMURA	Kyushu University	
Junping Tian	The University of Tokyo · ICEPP	
Kaori HATTORI	AIST	
Shigeki HIROSE	University of Tsukuba	
Megan Friend	KEK · IPNS	
Yasuhiro FUWA	JAEA	
Takahiko MASUDA	Okayama University	
Kodai MATSUOKA	KEK · IPNS	
Kenji MISHIMA	KEK · IMSS	
Gaku MITSUKA	KEK · ACCL	
Roger Wendell	Kyoto University	
Hiroko WATANABE	Tohoku University	

Our Position Towards the Final Deliverables



FYI: ILC-Japan

- The other subcommittee of JAHEP

Masaya Ishino (Spokesperson)

Shinichiro Michizono (Accelerator WG)

Wataru Otani (Detector WG)

Taikan Suehara (Physics WG)

Osamu Jinnouchi (Public Relations TF)

Nobuhiro Terunuma (Accelerator Part)

Yutaka Ushiroda (International Collaboration)

Shoji Asai (KEK Director Apr. 2024)

Kazu Hanagaki (KEK Executive Director)

Naohito Saito (KEK IPNS Director)

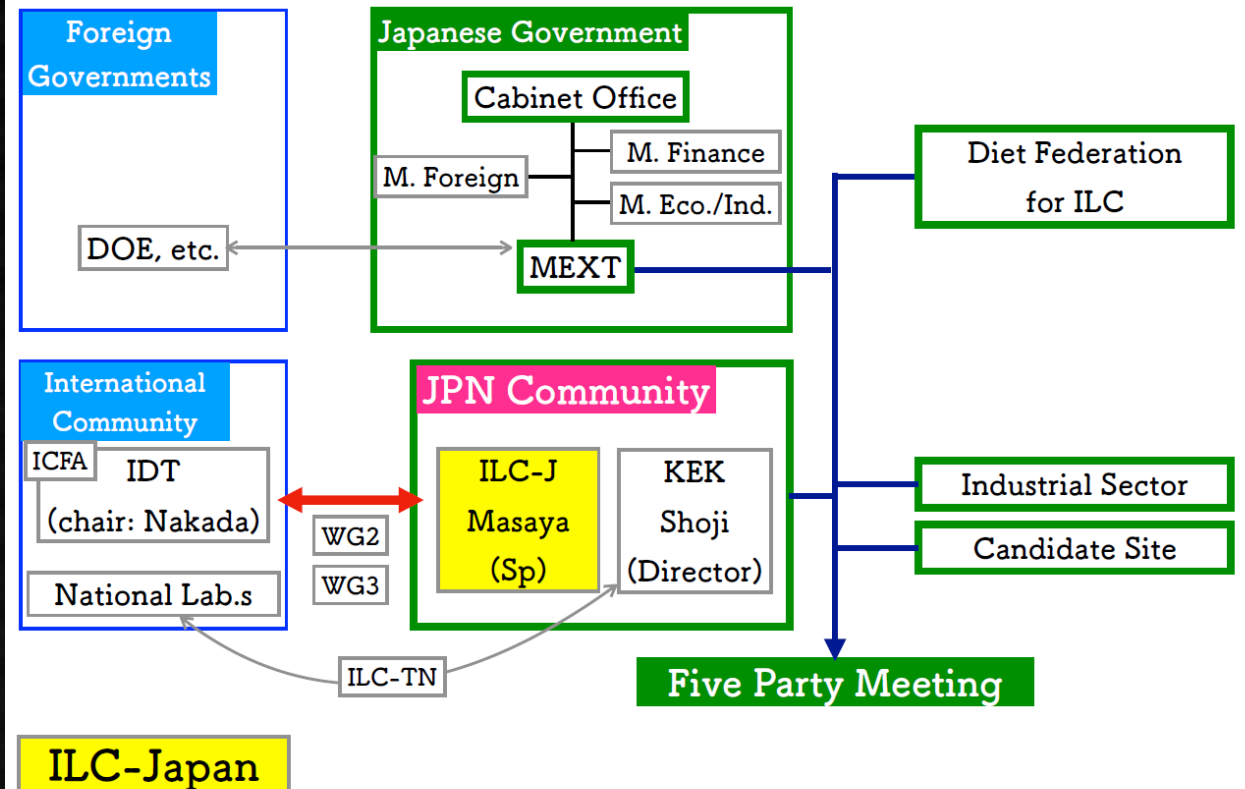
Tadashi Koseki (KEK Accelerator Director)

Tsuyoshi Nakaya (JAHEP Representative)

The Head of
WG/TF

from
KEK/JAHEP

2 recap ILC Promotion Framework (since 2021)



Established in 2021 under JAHEP with the aim of realizing ILC.
Promote ILC with representing the Japanese HEP community.

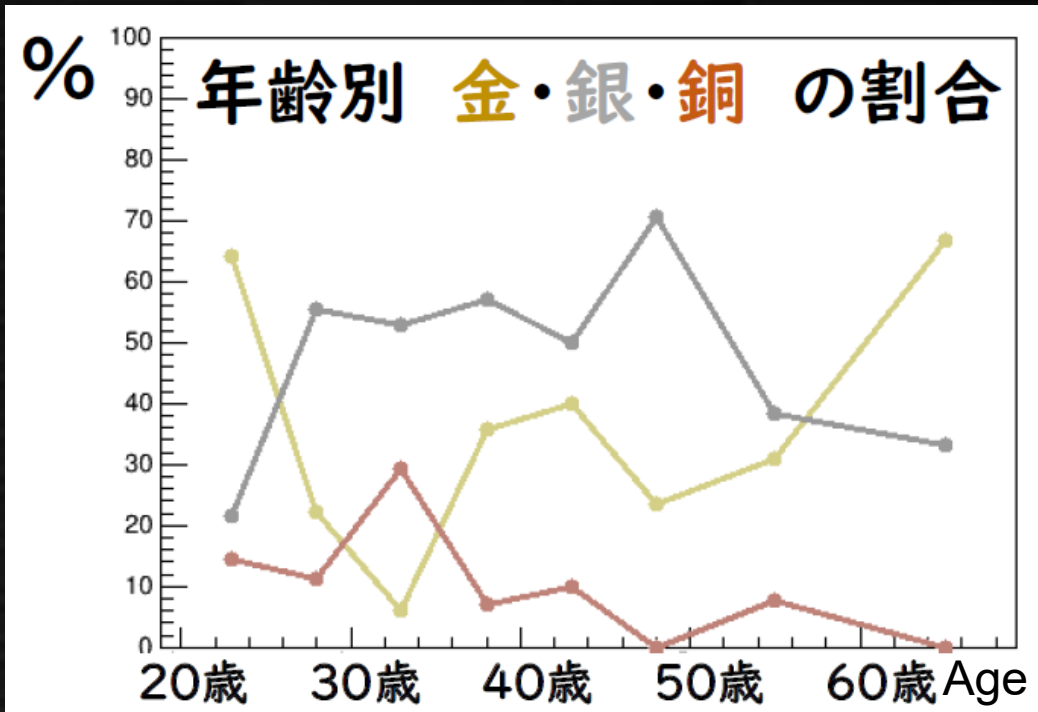
Past CFPs and reports

- 1986 (Nagashima): R&D for TeV e^+e^- collider (+SSC + b-factory)
- 1997 (Komamiya): hosting e^+e^- linear collider of 250-500 GeV as international project + KEKB
- 2012 (Mori):
 - Early realization of e^+e^- linear collider lead by Japan if Higgs found at LHC
 - Hyper-K if large θ_{13} found
- 2017 (Ishino): 250 GeV e^+e^- collider (since Higgs found) + HK
- 2019 (Ichikawa): No official prioritized report, summary of activity + visions on each topic given
- 2021 (Yorita): next page

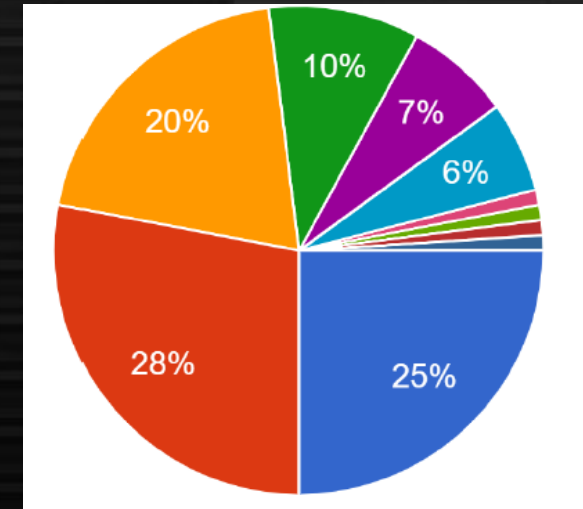
2021 CFP: activities

- Mandates are to investigate:
 1. Multilateral use of ILC (in terms of technology, facility and vision)
 2. Possible “alternative” (non-ILC) future projects in Japan
 3. Usage of state-of-the-art technology of quantum, AI, detectors
- The 2nd one is interpreted to
 - 3 aspects of future projects
 - e+e- linear collider in Japan without constraints of ILC design
 - Future of possible flavor physics
 - Investigation of muon colliders (including $\mu+e^- / \mu+\mu^+$ collider)
 - The focuses are “revisiting reasoning of ILC in Japan” and “How to get out of the so-called stacked situation”

Some results from questionnaire of 100 people



Preference of Japanese baseline project
 Gold: > 5B project (like ILC)
 Silver: <~1B projects (like SuperKEKB)
 Bronze: Multiple < 100M projects



Willingness to contribute to e+e- EF collider
 Blue: will do
 Red: will do if situation allows
 Yellow: unclear
 Green: not willing
 Purple: never
 Cyan: considering

Summary of future with e+e- linear collider

Investigated possible non-ILC e+e- linear collider options

- Starting from lower energies
 - No clear physics cases
- How to realize e+e- Higgs factory earlier / cheaper
 - Shorter tunnel with higher gradient → not mature enough
 - Lower luminosity for cost reduction → max. 10% cost reduction
losing luminosity significantly, not very cost-effective
- Path to higher energy → should seriously consider multi-TeV path
- Big lab with cooperation with other fields
 - E.g. silicon industry (EUV), RI production, etc.

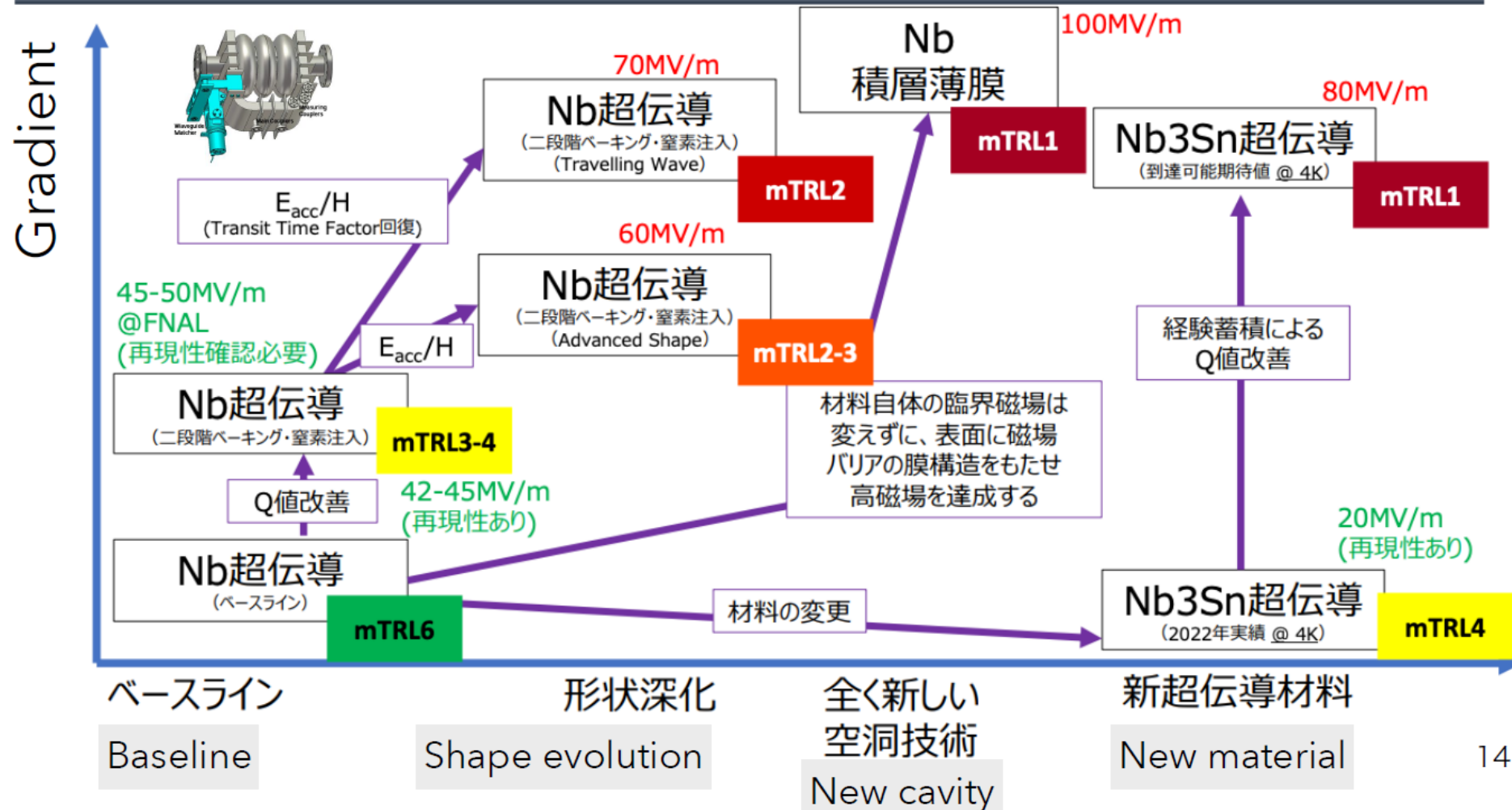
Accelerator technologies

Table shown at 2022/Sep. JPS symposium
「次世代コライダーへ向けた加速器技術」(坂上)

mTRL #	定義
mTRL1	アイデアはあるが未検証。実現性も不透明
mTRL2	アイデアはあるが未検証。実現に向けた道筋は見えている
mTRL3	技術が実験室レベルで検証された
mTRL4	技術がシステムとして再現性を持って検証された
mTRL5	検証されたシステムがコライダーにおける要求を満たすことが確認された
mTRL6	検証されたシステムの量産技術が確立された



高加速勾配へのシナリオ (超伝導) Superconducting



2024 CFP: mandate

- Input to European strategy (revised by earlier timeline)
 - Investigate ILC and other Higgs factories on (a) physics importance, (b) technical maturity and development, resource, international situation, (c) possible contribution from Japan, and if possible how to treat them as JAHEP future plans, with close discussions with HEC and ILC-Japan.
 - Report or slides to be submitted to HEC by end of 2024
 - HEC will prepare ES input based on it, clarifying plans of JAHEP to realize ILC and how to treat FCC-ee and CEPC
- Report on future plans of JAHEP for coming 10 years
 - Including non-HF projects
 - Draft by CFP by end of 2025, final report by HEC in 2026

Towards European strategic input

- **Work process (planned)**

- Research and sorting out issues within the committee (present to August)
 - Established a working group consisting of the physics team, accelerator team, detector team, and project team to begin investigations.
 - Existing future planning discussion materials will also be utilized (the previous future planning committee discussion materials) and

We also use events such as tea workshops (next page) to gather the latest information.
 - Information will also be released from the Future Planning Committee as appropriate (public future planning committee, etc.)
- Survey (September)
 - An online meeting will be held to explain the purpose of the survey.
- Discussion within the Future Planning Committee + Joint discussion with the High Energy Committee (October, November)
- Town hall meetings and submissions to the High Energy Committee (November and December)

Our focuses (before ES input)

- How to place ILC in our future projects
 - Most people recognizes ILC a valuable project “if realized”
 - But enthusiasm getting reduced because of stacked situation
 - How to realize ILC is far from research effort – people feel helpless
- How to respond to FCCee/CEPC progress
 - This seems the main focus on the investigation stage (to August)
 - Since this is officially not discussed at all in the previous CFPs
 - We are learning circular projects, with focus on comparison with linear
 - On physics cases, detector and accelerator technologies, project realization
 - Serious discussion on how (and how much) to contribute to circular HF

Additional comments

- The connection to outside Japan is well recognized, but methodology of interaction still not very clear
 - Discussion with FCC/CEPC foreseen (as well as ILC Japan)
 - Some kind of light LoI will be called but for second process after European strategy
 - Welcome your opinions! (through myself now)
 - About methodology of communication
 - Also for strategy itself
- CFP indico (some meetings are open)
 - <https://kds.kek.jp/category/2659/>