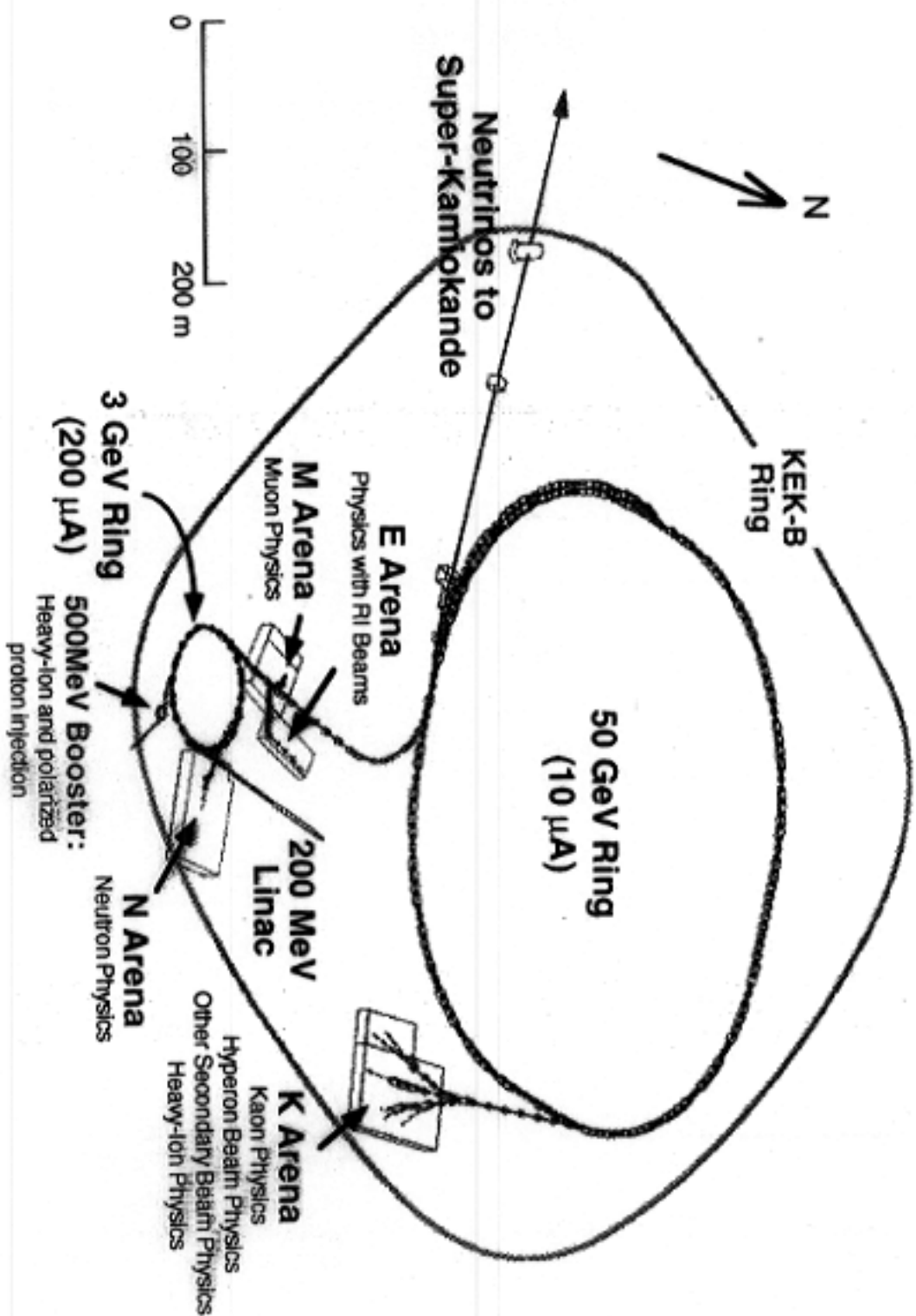


Status of Japan Hadron Facility (JHF) and the KEK-JAERI Joint Project

Shoji Nagamiya (KEK)

- JHF and the Joint Project between KEK and JAERI
- Sciences with the Joint Project
- Proposed Cost and Schedule
- Possible Upgrade Paths

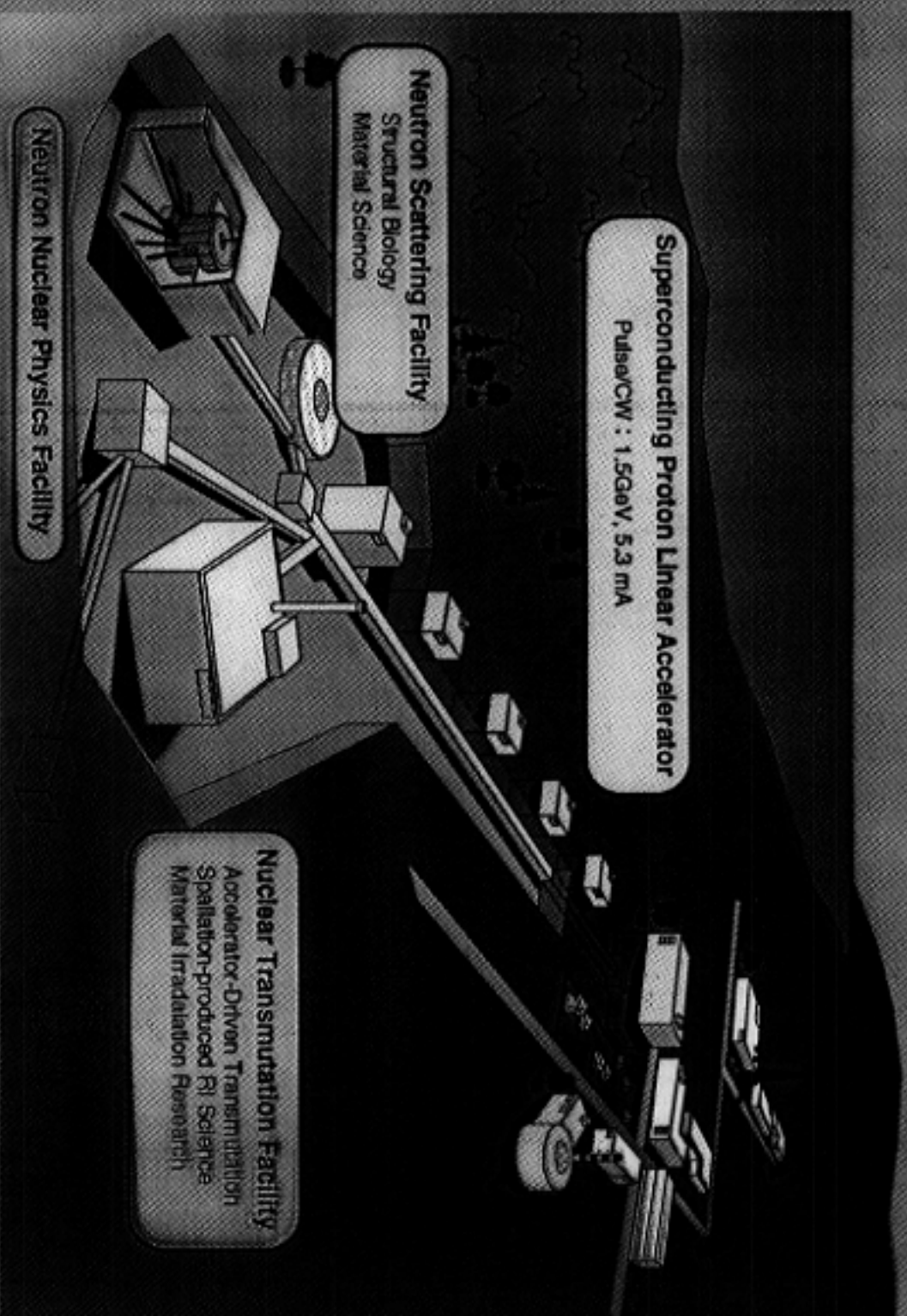
Japan Hadron Facility (JHF) Project at KEK



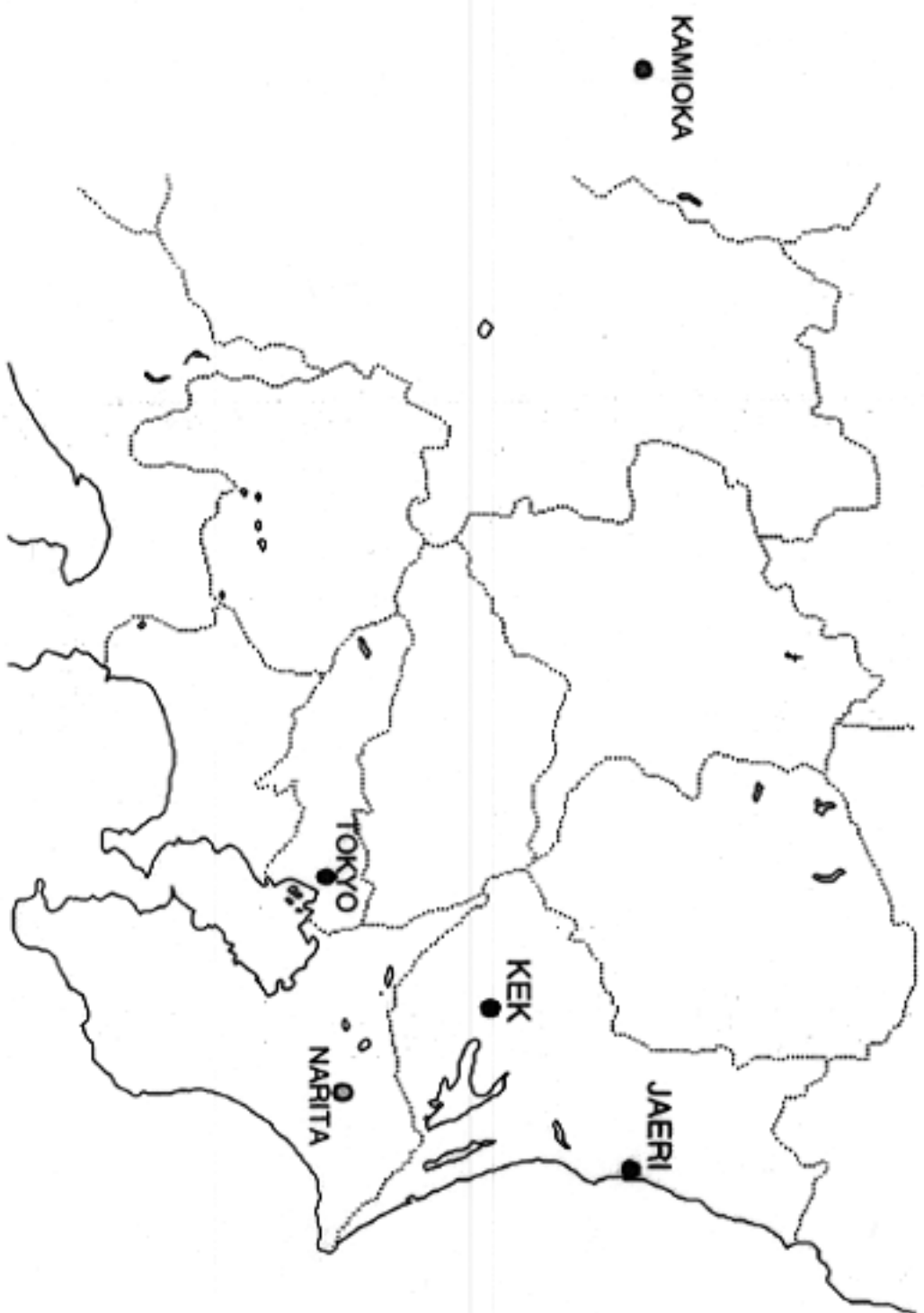
Major Events around the JHF

- Summer, 1995: Concept of the current JHF
 - 50 GeV PS became the main component (previously, the main component was 1 GeV Linac).
- Spring, 1997: New KEK formed
 - The main motivation was to construct JHF.
- Late Spring, 1997: Major reviews
 - International review (chair: E. Vogt)
 - Monbusho's review: JHF must be the first-priority new construction item.
- August, 1998: Suggestion of a joint effort between Monbusho and Science and Tech. Agency (STA)
- August, 1999: Monbusho-STA decided to propose the project together.

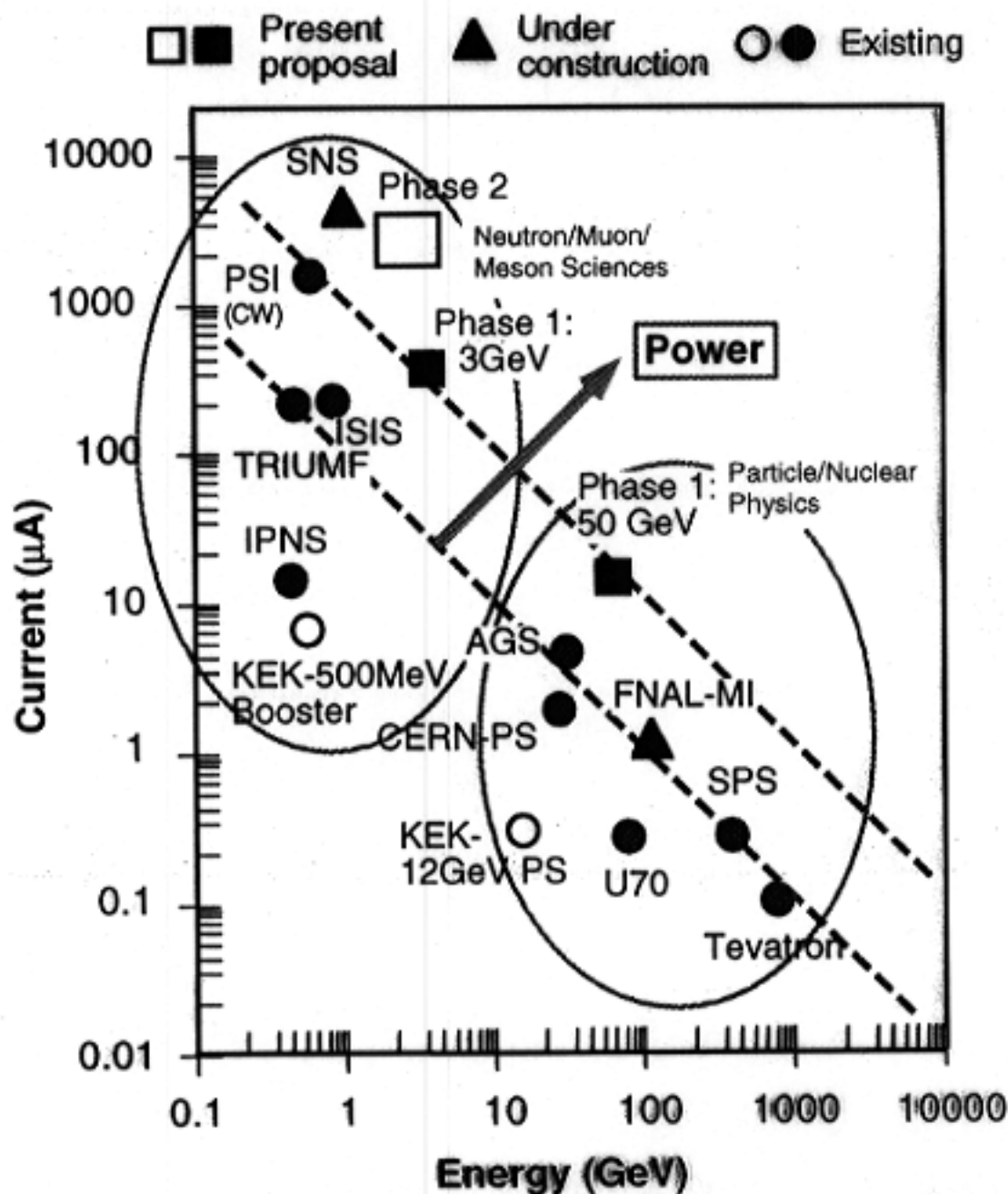
Planned Research Facility Complex for Neutron Science



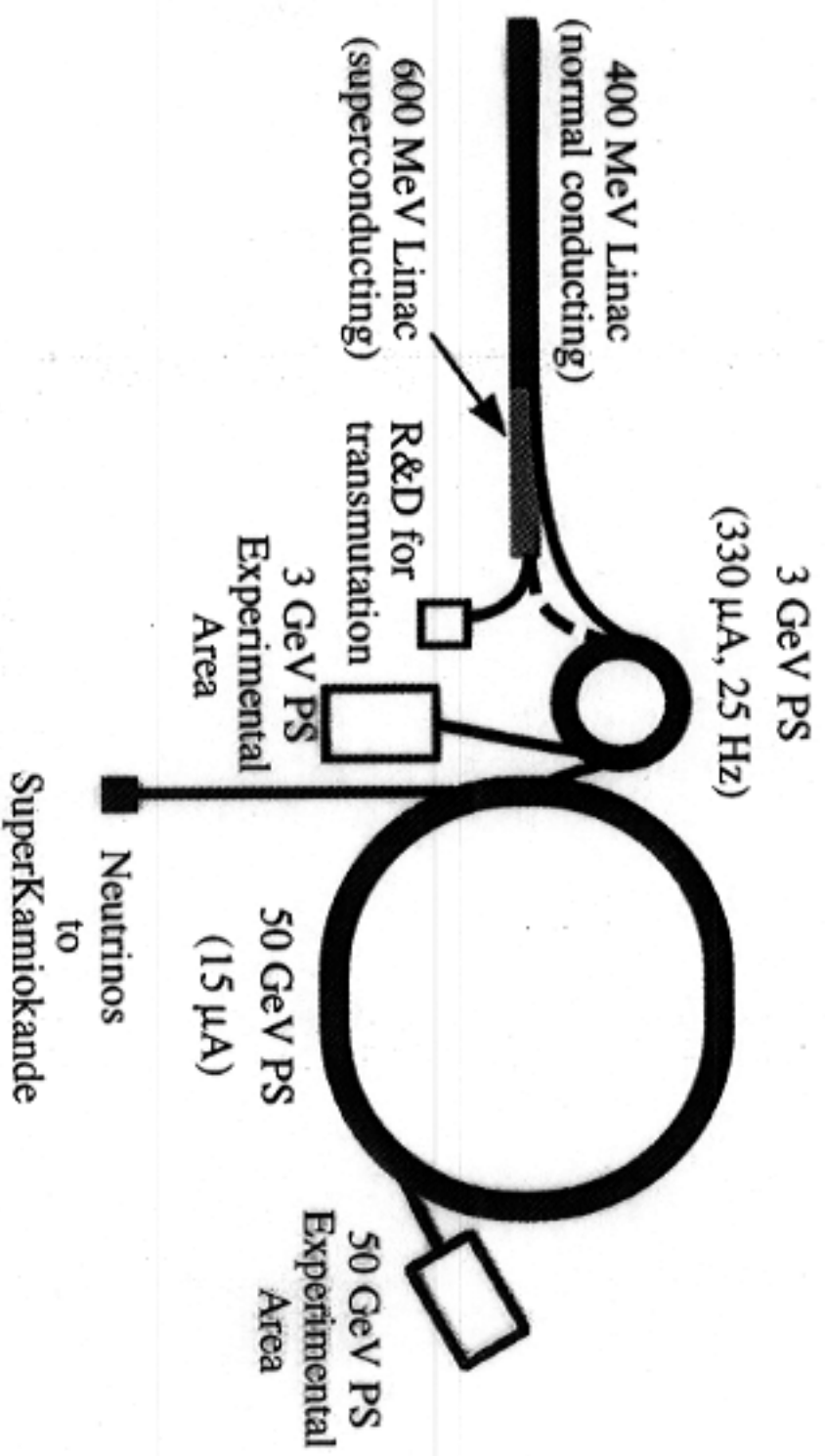
Site of JAERI-Tokai



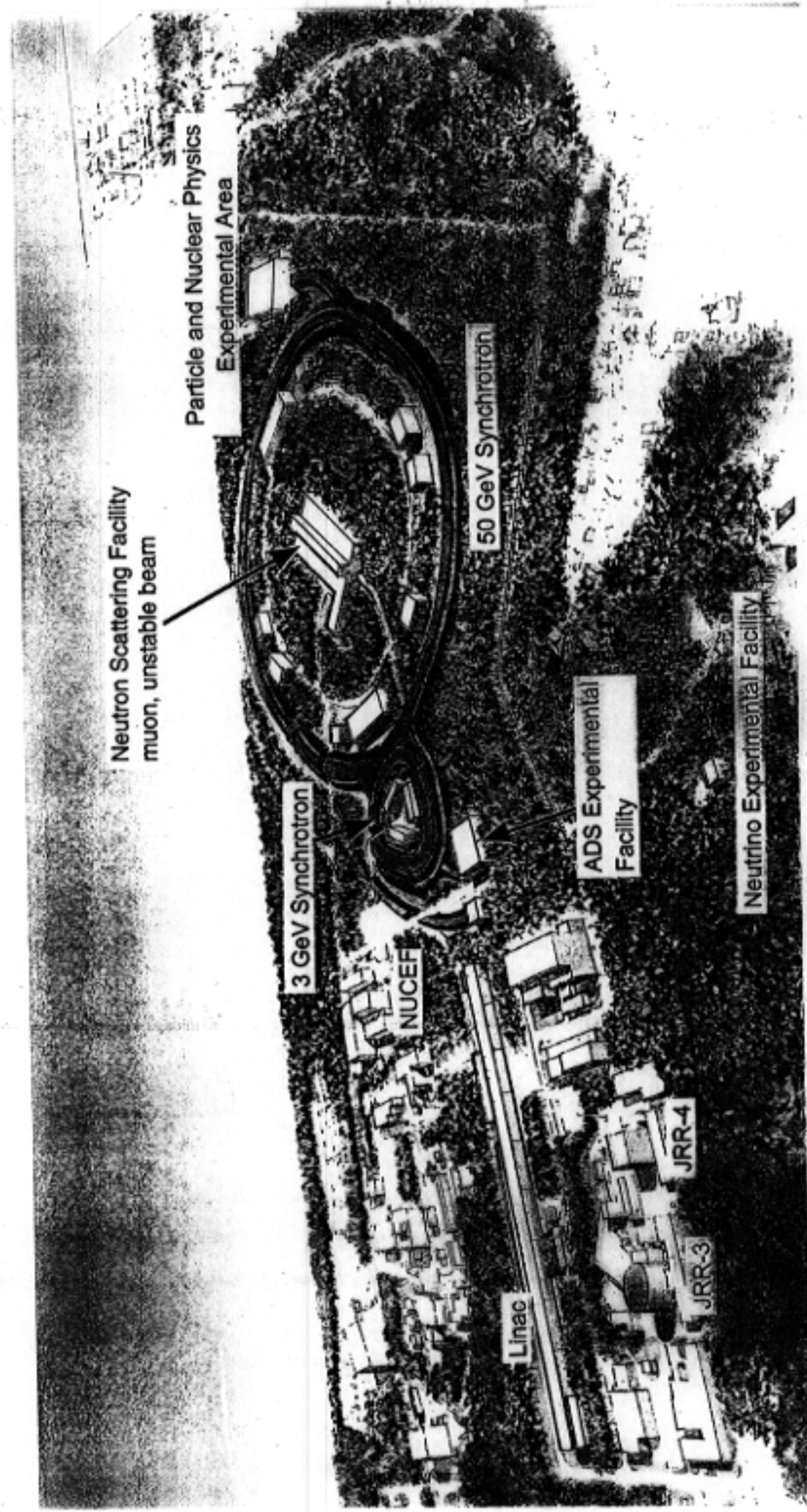
Major Fixed Target Proton Accelerators



Phase 1 Project



Phase 1 = 1 MW for 3 GeV
Phase 2 = 5 MW in the GeV region



JAERI-KEK Joint Project

Recent Activities

- March, 1999: MOU between JAEFI and KEK signed.
 - New organization for the project was initiated.
- April, 1999: International Review: Y. Cho (chair)
 - Emphasized the importance of the joint effort.
- May, 1999:
 - Monbusho: Science Council emphasizes the importance of a cooperative effort between KEK and JAEFI.
 - STA: The Joint Proposal was submitted to the Atomic Energy Council of Japan. Enthusiastic!
- September, 1999: Monbusho & STA explained the Joint Proposal to the Ministry of Finance.
- October, 1999: To start another (& the last) major review.

大型ハドロン計画と中性子科学研究計画の 推進に関する覚書

大強度陽子加速器を用いた科学技術の総合的展開を図るために、高エネルギー加速器研究機構（以下「機構」という。）と日本原子力研究所（以下「原研」という。）は、機構の大型ハドロン計画と原研の中性子科学研究計画を共同で推進することとした。本覚書は、機構と原研（以下「両機関」という。）が相互信頼に立って計画の策定及び施設の建設に係る連携・協力を進めるための基本的な考え方を定めるものである。

なお、施設建設後の運営に関しては、別途協議するものとする。

1. 両機関は、大型ハドロン計画と中性子科学研究計画の加速器及び実験施設を原研の東海研究所に建設するための統合計画を策定する。
2. 両機関は、機構・原研の代表、ユーザーコミュニティの代表及び学識経験者で構成される協議委員会を設置し、統合計画の推進にあたっての重要事項について協議委員会の意見を聴きつつ進める。
3. 統合計画の推進は、機構の大型ハドロン計画推進室と原研の東海研究所中性子科学研究センターを中心に編成される「共同推進チーム」によって行う。

平成11年3月18日

茨城県つくば市大穂1-1

高エネルギー加速器研究機構長

菅原寛



東京都千代田区内幸町2-2-2

日本原子力研究所理事長

松浦祥次郎



Various secondary beams produced with high-intensity proton beam

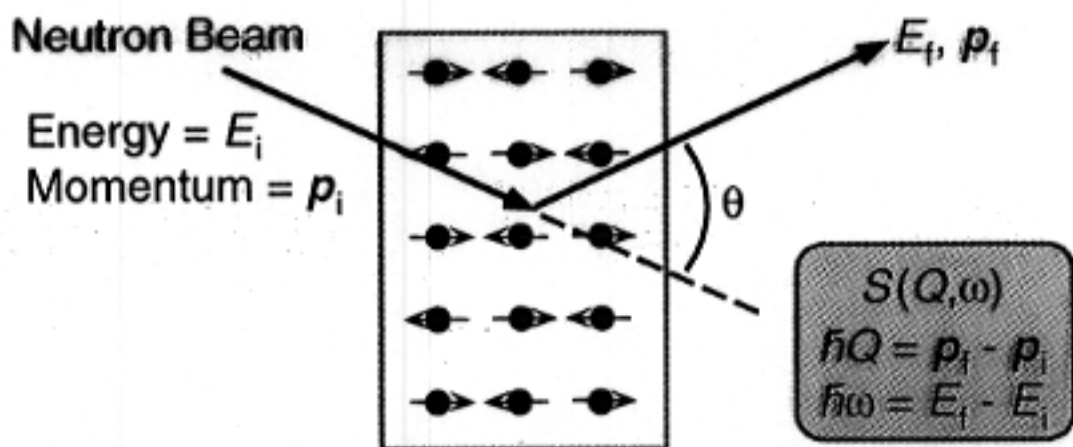


Beams of Short-Lived Nuclei

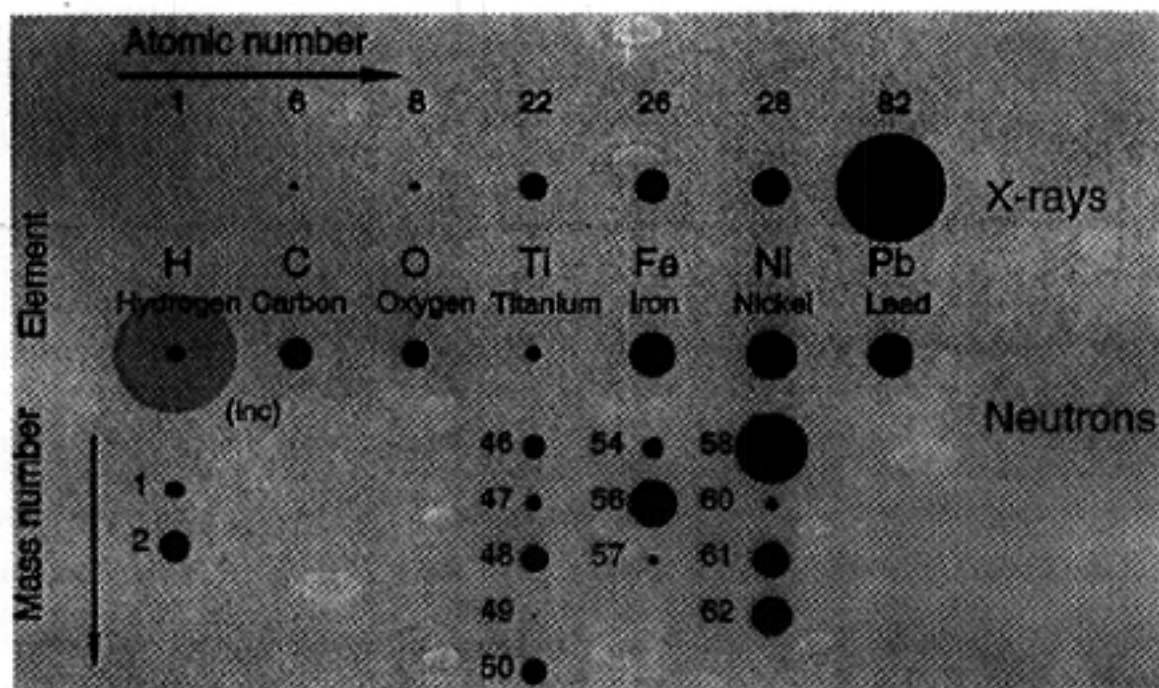
Nuclear astrophysics, Super-heavy element

Unique Properties of Neutron

- No Charge, Finite Magnetic Moment



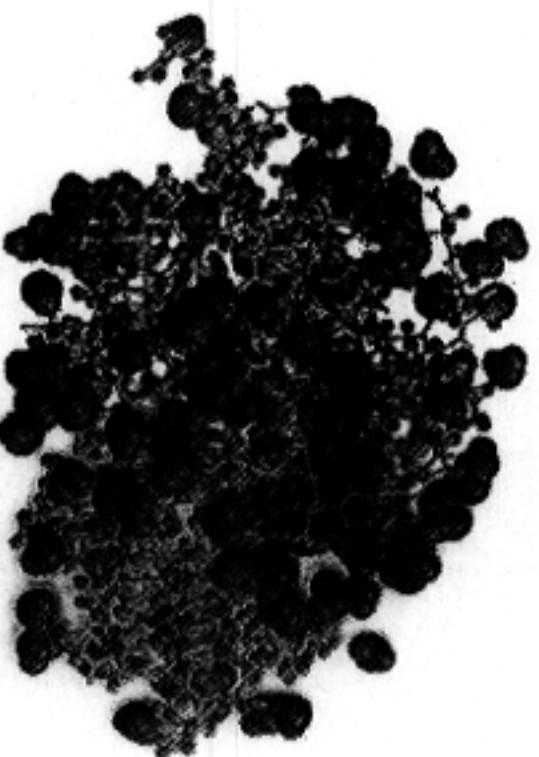
- Neutron Mass \approx Hydrogen Mass



Comparison of protein structure analysis between X-ray and neutron beam



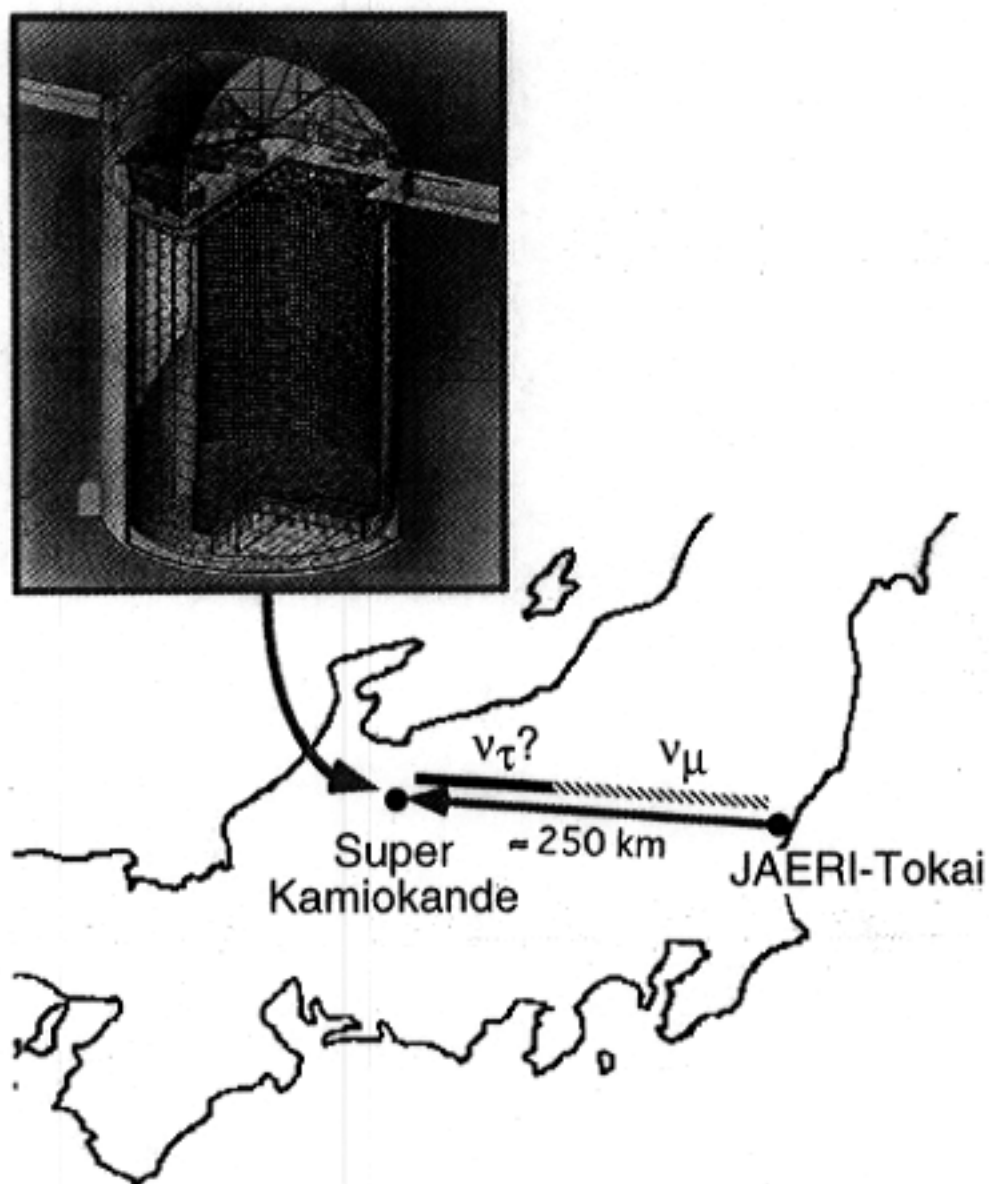
Molecular backbone structure (C, N, O, S)
determined by ***X-ray analysis***



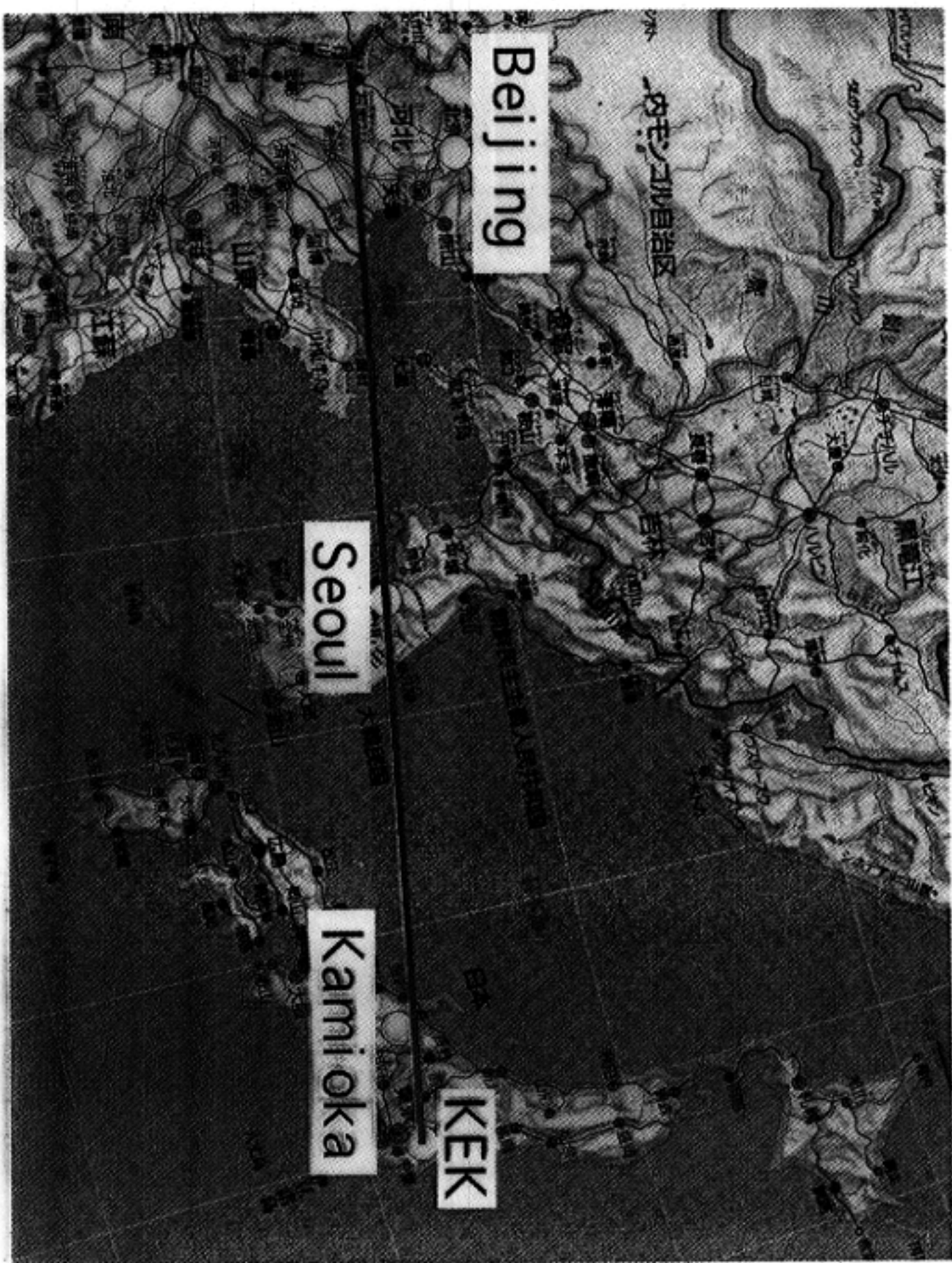
Total 3-D arrangement including 157 solvent H₂O
molecules and 948 hydrogen atoms determined by
neutron analysis by Niimura, JAERI
3 weeks neutron irradiation at ILL

Hen Egg-White Lysozyme

JAERI-Tokai → SuperKamiokande Neutrino Oscillation Experiment

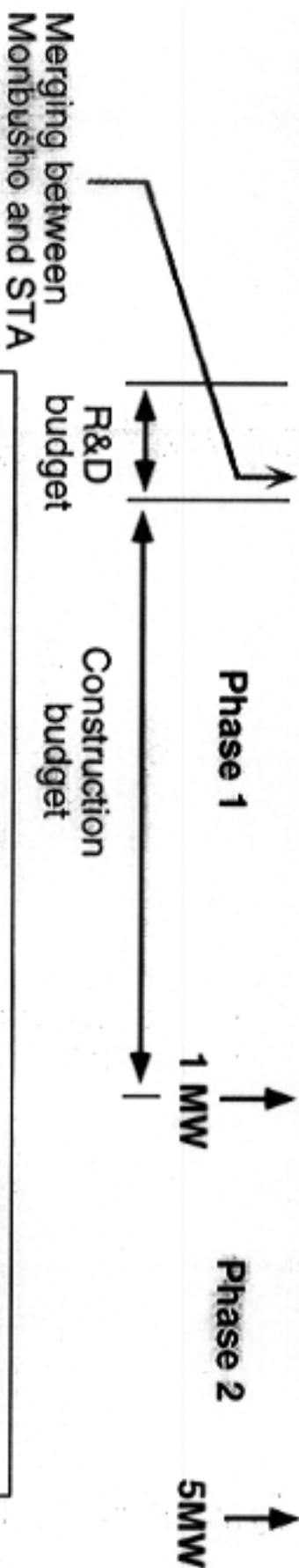


Importance and significance + alternative
are currently under a serious review!



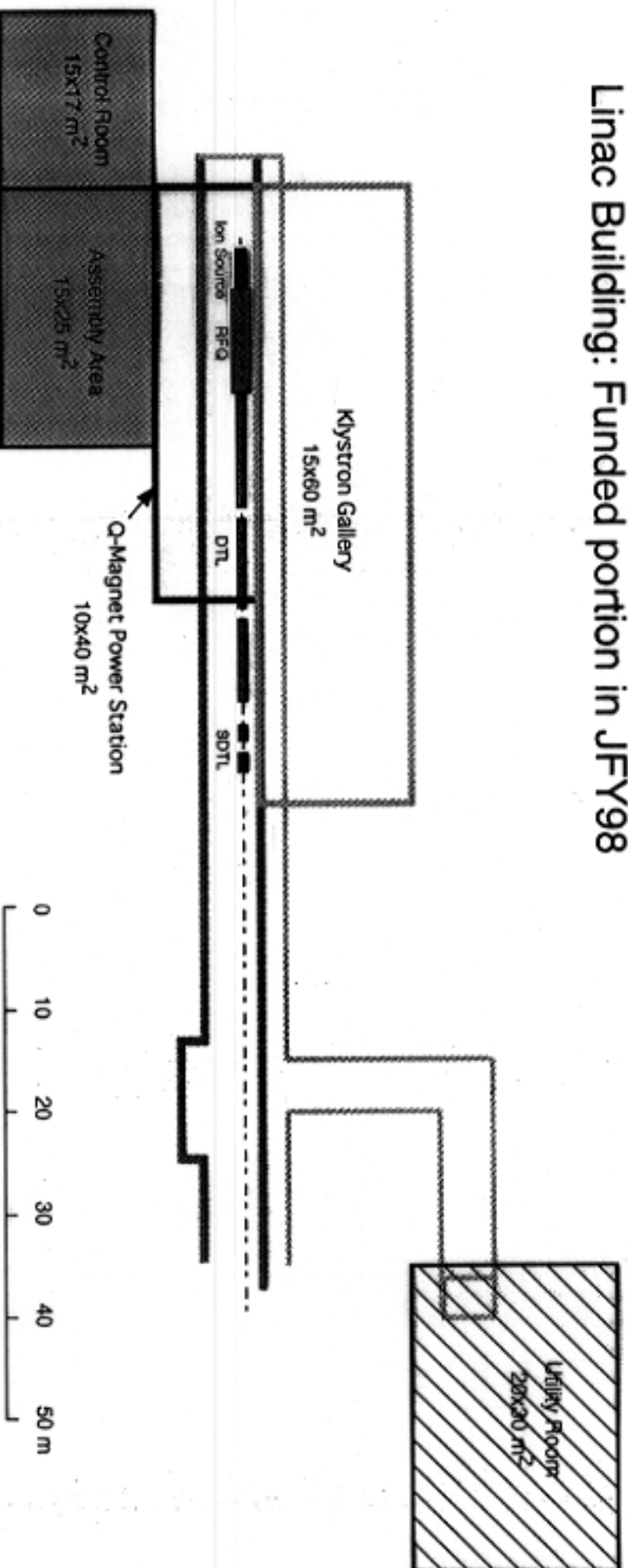
Proposed Schedule

	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08
Linac	-----	-----	-----	-----	-----	-----	-----	-----	-----
Superconducting Linac									
3 GeV Synchrotron									
50 GeV Synchrotron	-----	-----	-----	-----	-----	-----	-----	-----	-----
Neutron Scattering Facility									
Muon Facility									
Unstable Beam Facility									
Transmutation									
Nuclear/Particle Phys. Fac.									



R&D Budget for FY00 (requested to Min. Finance) \approx 36 Oku Yen
 Total Phase 1 Cost \approx 1,500 Oku Yen

Linac Building: Funded portion in JFY98

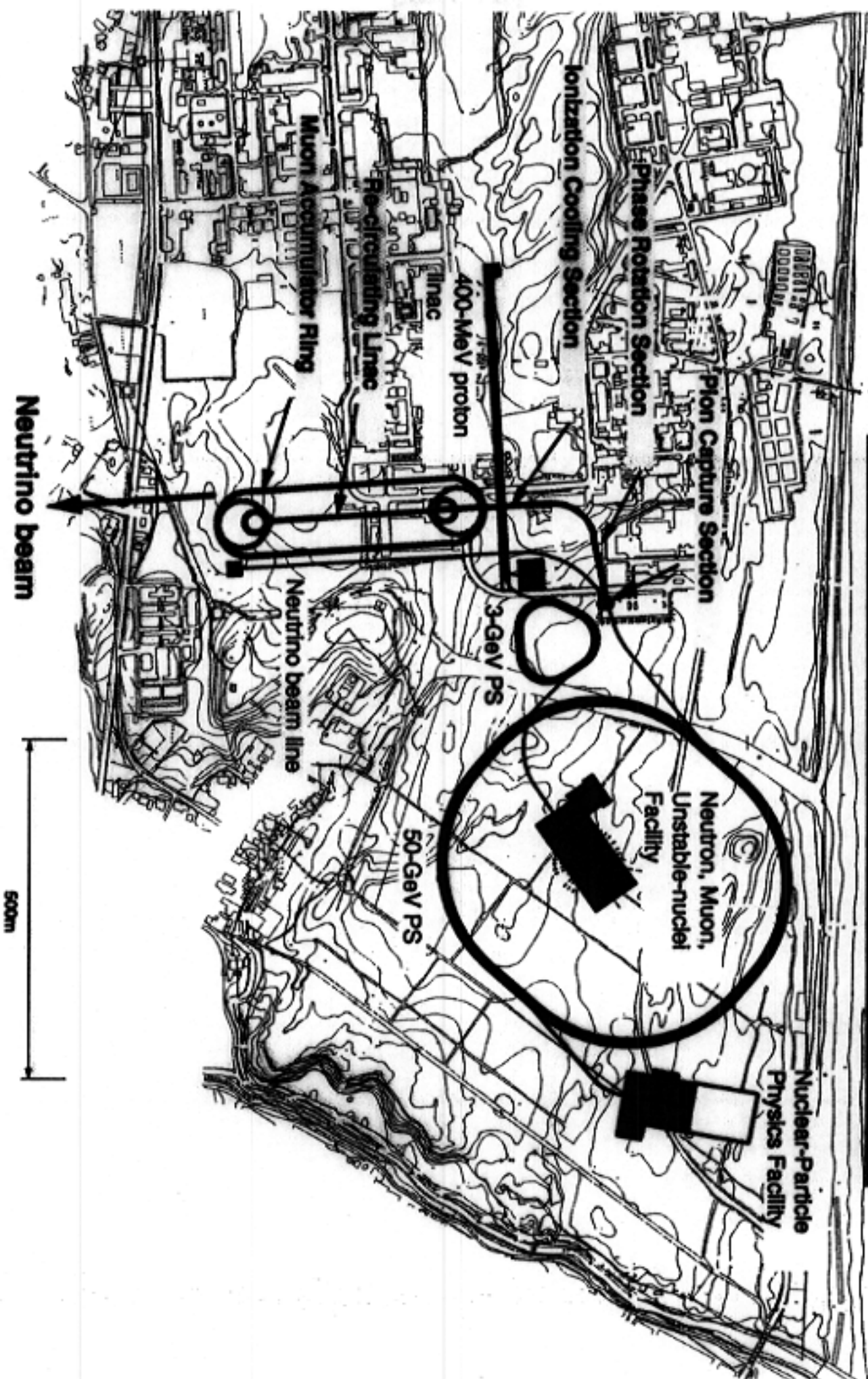


- Funded in JFY98 with Supplemental Budget
 - Under construction at KEK
 - Will be moved to Tokai later
- (in case that the Joint Project is approved)

Possible Upgrades

- From 1 MW to 5 MW
 - Strong voice toward 5 MW from neutron scattering community.
 - Also, this upgrade is useful for nuclear transmutation.
- Nuclear/particle physics
 - Neutrino factory
 - Muon factory
 - Anti-proton accumulator ring
 - Ultra cold neutrons
 - Heavy-ion beams at about 20 GeV per nucleon
 - Polarized protons

Neutrino Factory in Japan



Major Highlights

- High intensity proton accelerators
 - 600 MeV Linac: R&D for nuclear transmutation
 - 3 GeV PS (333 μ A, 25 Hz, 1 MW): Neutron sciences, muon sciences, unstable nuclear beams
 - 50 GeV PS (15 μ A, 0.3 Hz): Nuclear/particle physics
- Many types of secondary beams
 - 50 GeV: K, π , antiproton, neutrino, etc.
 - 3 GeV: neutron, muon, unstable nuclei, etc.
- Multi-purpose nuclear-, particle-, materials-, and biological sciences + nuclear technology.
- World-class facility open to international users.

Summary

- **Uniqueness of the Project**
 - World's highest intensity for proton beams.
 - Variety of secondary beams.
 - Variety of frontier sciences + transmutation with one accelerator complex.
- **International Research Center**
 - Would like to create a research center in the Asian/Oceanic region.
 - Would also like to invite scientists from Europe and the US.
- **First Example of the Joint Project between Two Agencies, Monbusho and STA**
 - We hope that this project be funded for JFY01.