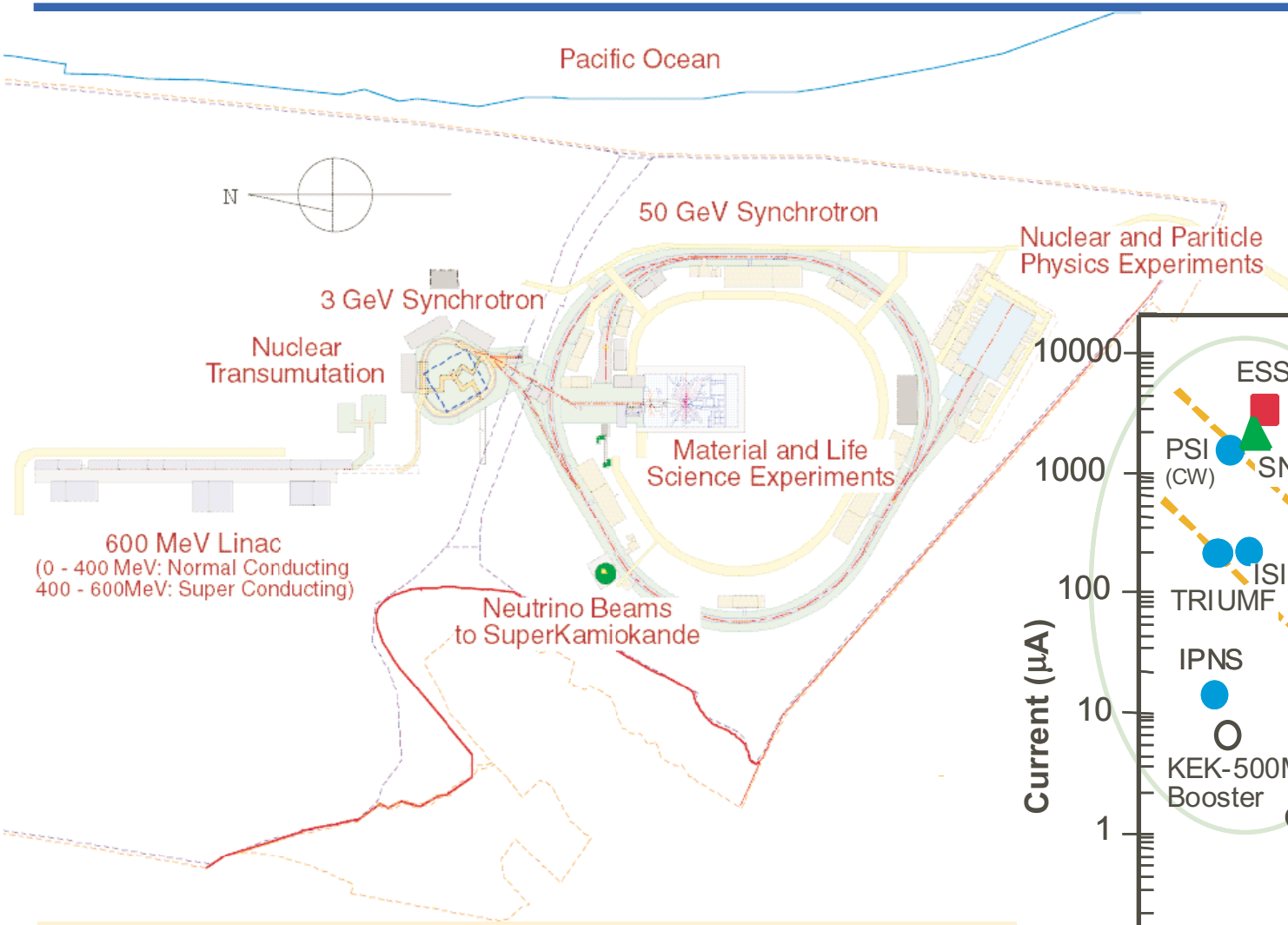
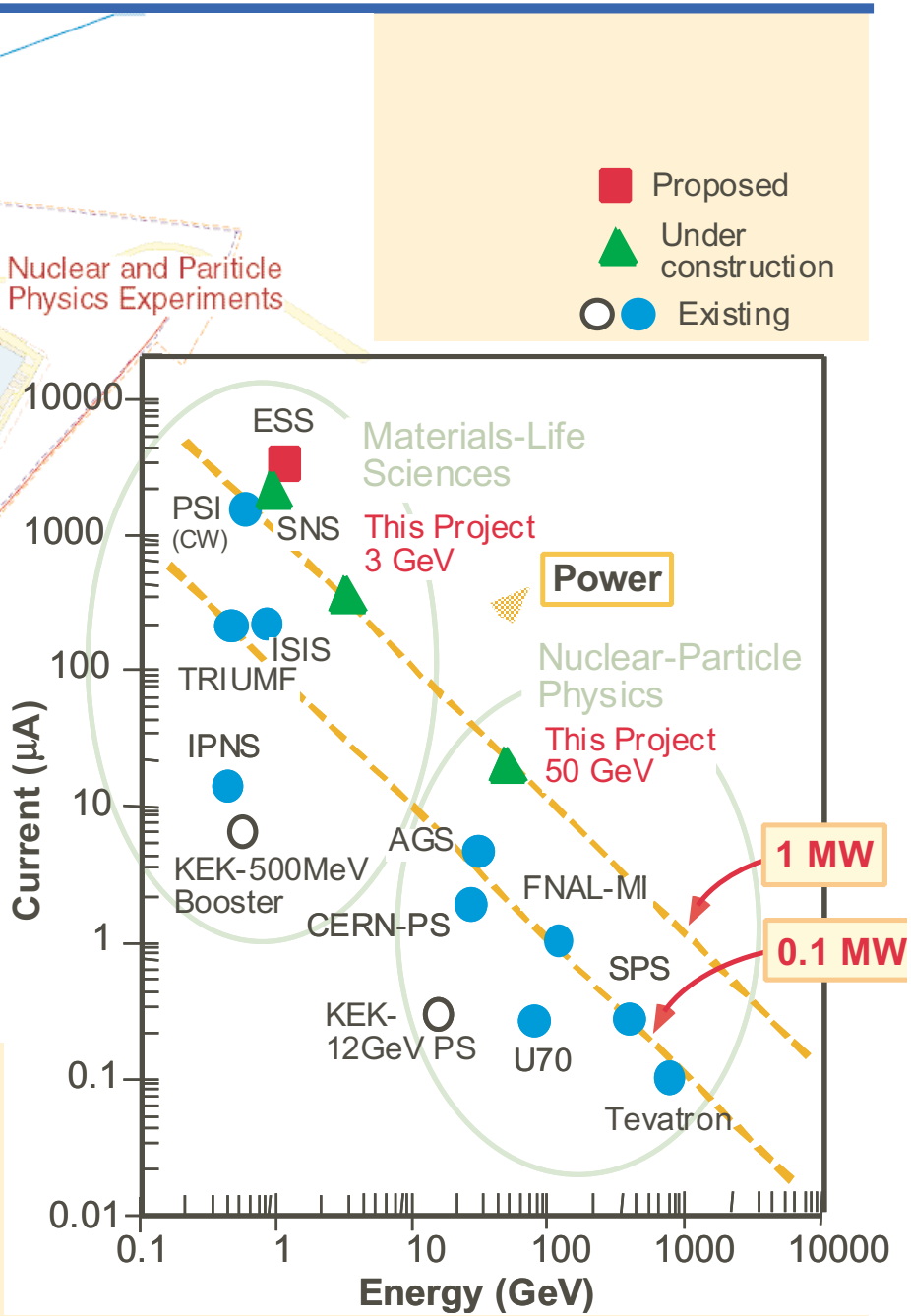
Controls at JAERI - KEK Joint Project and EPICS at KEK

Kazuro Furukawa, KEK
<kazuro.furukawa@kek.jp>

for
Joint Project Controls Group
EPICS Group

- **Joint Project**
- **Control Systems at KEK**
- **Controls at Joint Project**



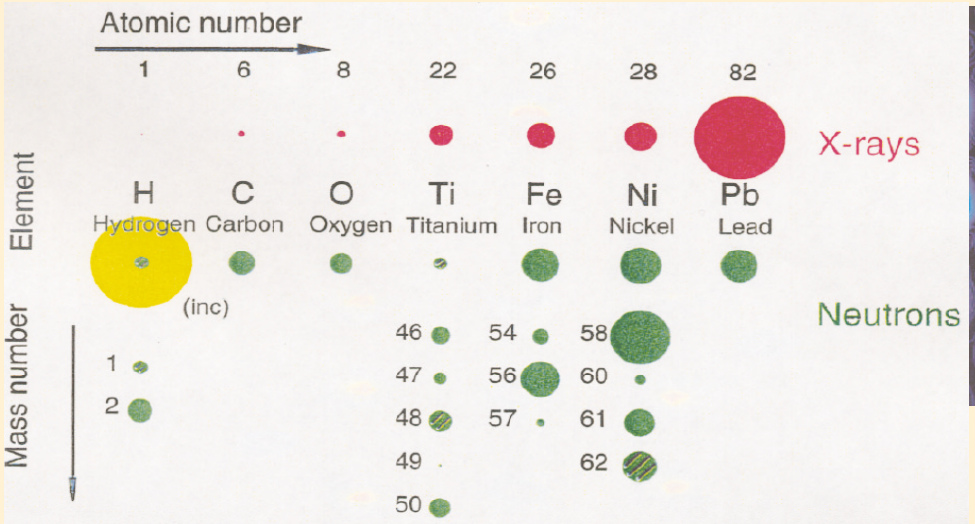


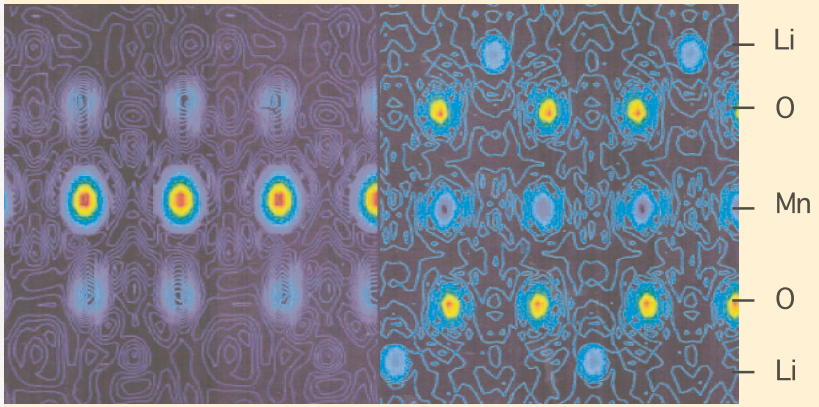
◆ At JAERI Site (50 km North from KEK)

JAERI - KEK Joint Project

Example of Study

◆ Neutron Science





T. Kamiyama, et al

Material for Li-battery seen by X rays (left) and Neutrons (right)

X-rays interact with electrons.

- X-rays see high-Z atoms.

Neutrons interact with nuclei.

- Neutrons see low-Z atoms.

Need Different Kinds of Probes to Study

◆ Nuclear Physics with Kaon, etc

◆ Nutrino Physics (Kamiokande)

◆ Nuclear Transmutation

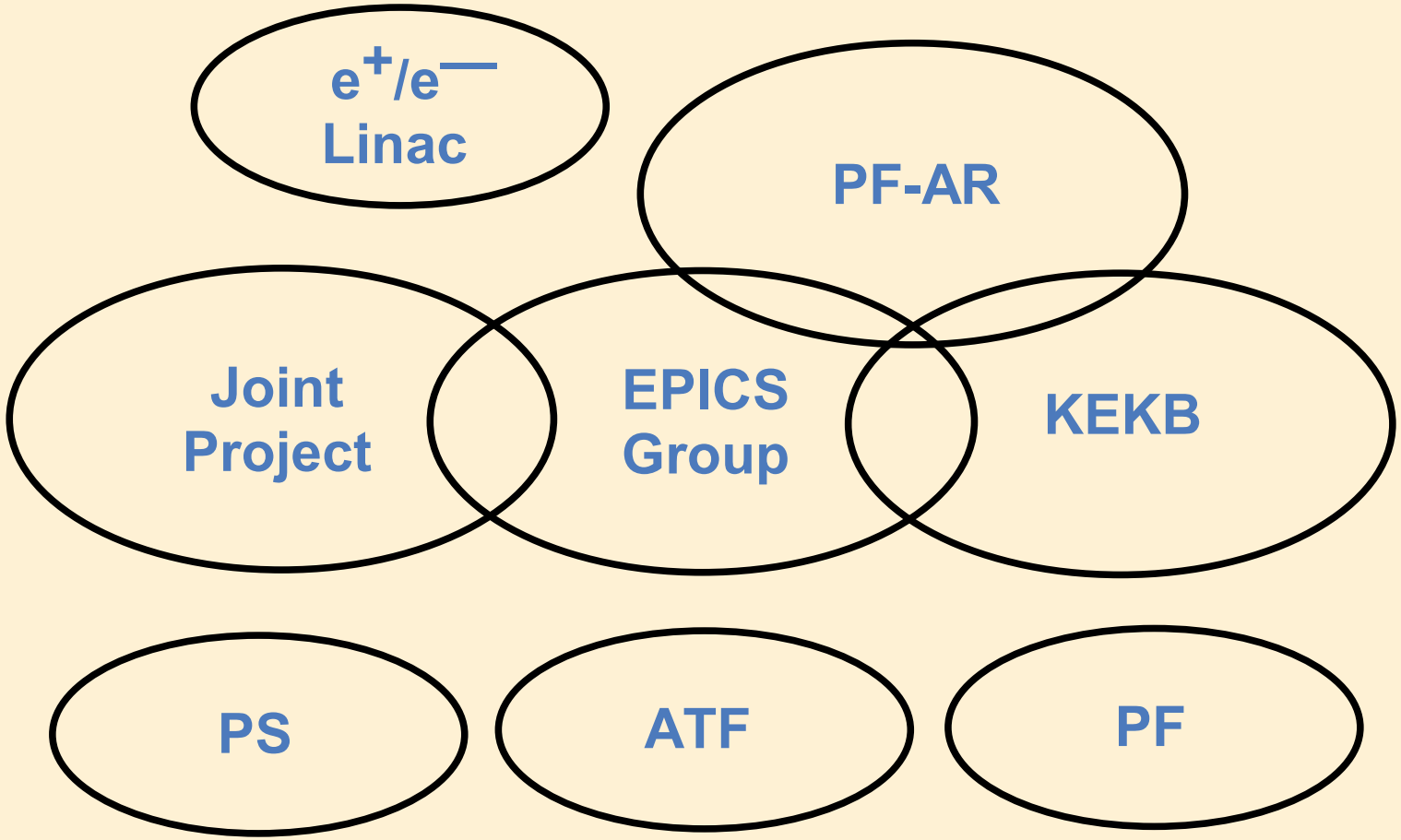
Control Systems at KEK

- KEKB Ring -- e^-/e^+ Collider, EPICS, 1998~
  Establishing Luminosity Records
  Controls of Utility System will be Based on EPICS
- PF-AR -- e- Light Source, EPICS, 2001~ (1987~)
  EPICS Conversion Went Well
  (+Channel Archiver, Delphi, ...)
- JAERI-KEK Joint Project -- EPICS, 2006~
  Just Started ...
- e^-/e^+ Linac -- RPC, PF -- DataChannel,
  PS -- Windows +VME/MAP, ATF -- V-System
  Their Own Control Systems
- EPICS Traversal Group
  Standardization of EPICS Environment, etc

EPICS (Traversal) Group at KEK

- Standard EPICS Environment (Directory Structure, etc)
- EPICS Document Translation?
- Training

Core Members
N.Yamamoto
N.Kamikubota
J.Odagiri

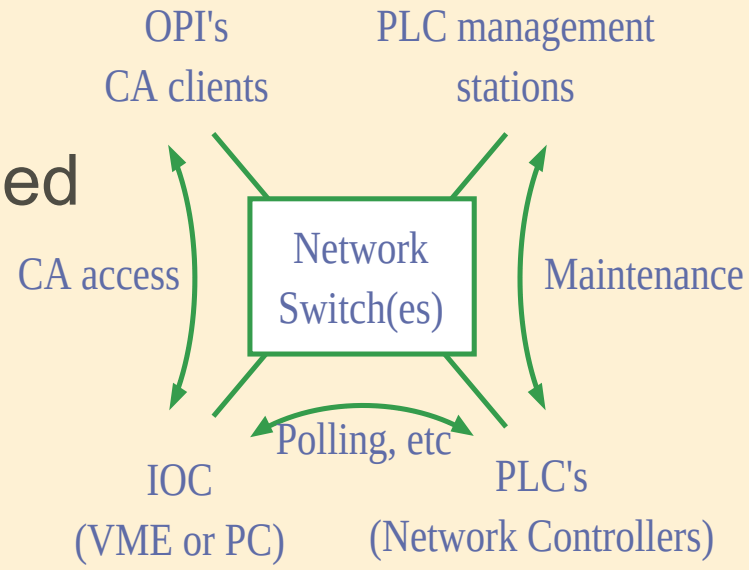


Controls for JAERI-KEK Joint Project

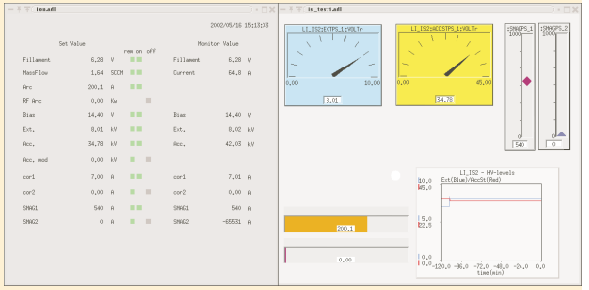
- EPICS
  - Network-wide Controls
  - Success at KEKB (~100 IOC s)
- SAD + Python, etc.
  - Application/GUI (for Rings)
    - Linac: SAD + ? (with Space-charge)
- Sub-systems
  - Designed mainly by Equipment Groups
  - Sub-contract (with Interface to EPICS?)
  - Detachable Sub-systems, preferable?
- IP/Network based Controllers
  - No Specific Local Field Network, but only Ethernet
  - Success at e^+/e^- Linac (~250 Controllers)

Network Based Controller (NC) under EPICS (1)

- 5 Components
- NC (such as PLC) : Mostly Designed
  by Experts, Carrys Local Logics
- EPICS IOC : Carrys Logics
  between Several Devices
- EPICS OPI : Normal OPI
  Do not See Existence of NCs
- Management Station : Software Downloading
  and Monitoring
- Network : Switch Technology
  Physical and Logical Views are Different

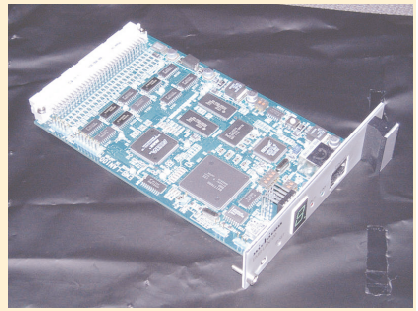


Network Based Controllers



- PLC :
  - Yokogawa's FA-M3 (Factory ACE)
    - Maintenance Capability over Ethernet/IP
  - Evaluating Basic EPICS Device Support

- Measurement Station :
  - Yokogawa's WE7000 for Now
    - 100ks/s, 100Ms/s, (1Gs/s,) 10MHz FG.
  - Improving Device Support outsourced to Mitsubishi.Co.
    - Simple Function: ~1ms



- DTL-Q Power Supply :
  - Designed Dedicated Plug-in Ethernet Controller
    - Mostly the Same Protocol as PLC
    - Produced by Nichicon Co./Internix Co.

Other Issues

- Naming Convention
  - Continueing Discussions, Mostly Fixed?
  - Documentation
- Timing Modules
  - Designing Improved Vesion, EPICS Integration
  - 50Hz Data Aquisition?
- Device Supports
  - Developing New Ones, Evaluating KEKB s Ones
- Database
  - Cabling Management, Beam-line Components
- Application Development Environment
  - with EPICS Group
- Training
  - with/by EPICS Group