



EPAC highlights

Y. Papaphilippou

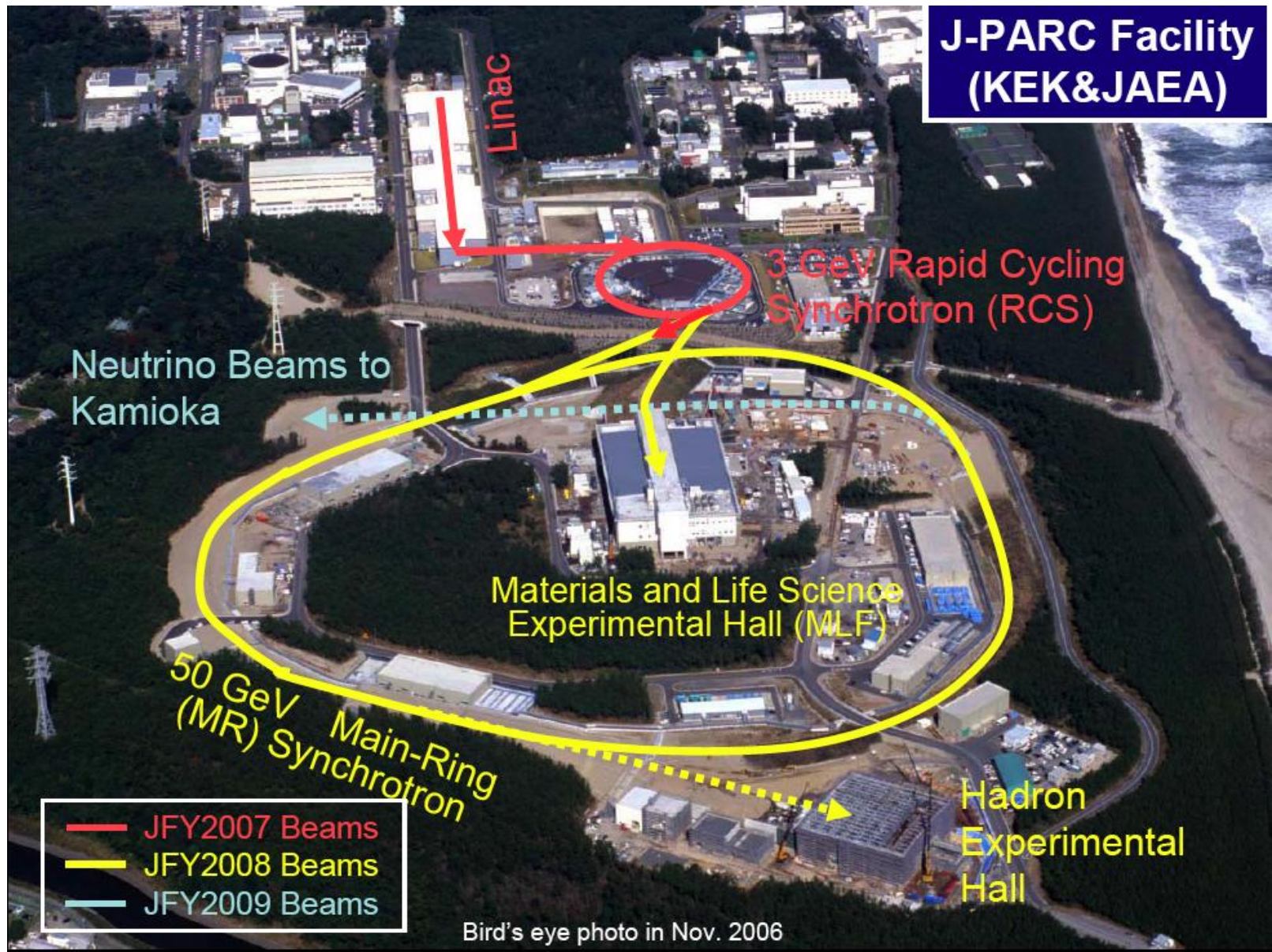
July 23rd, 2008

Outline

- J-PARC commissioning progress and challenges
- SNS progress
- Collaboration with US (LARP)

J-PARC commissioning progress

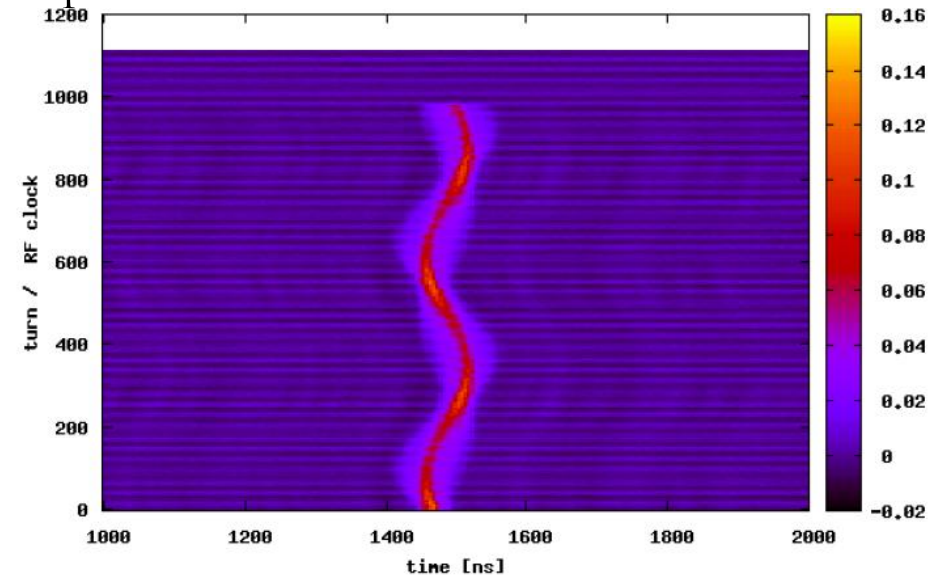
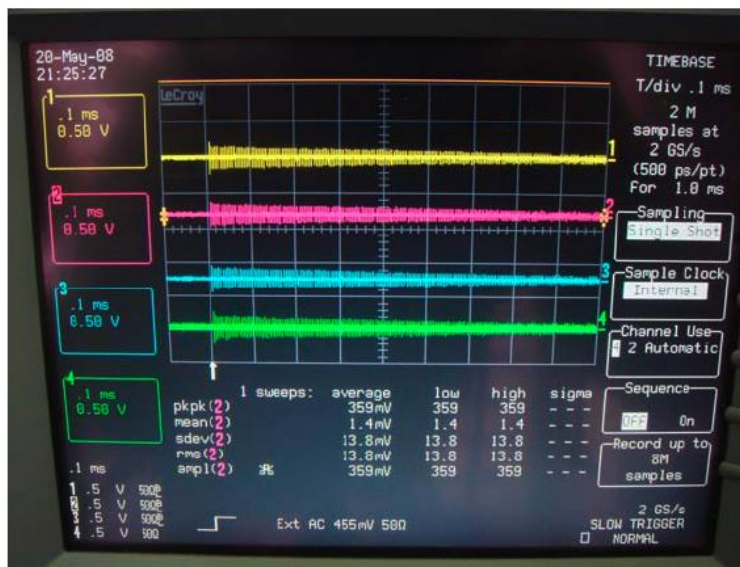
M. Kinsho, J-PARC



J-PARC commissioning progress II

M. Kinsho, J-PARC

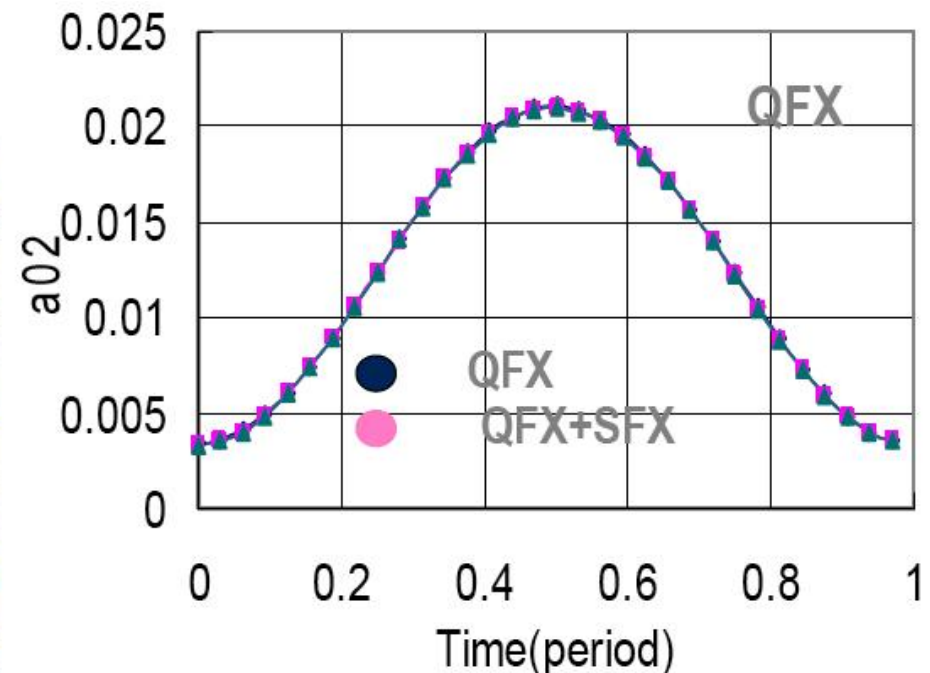
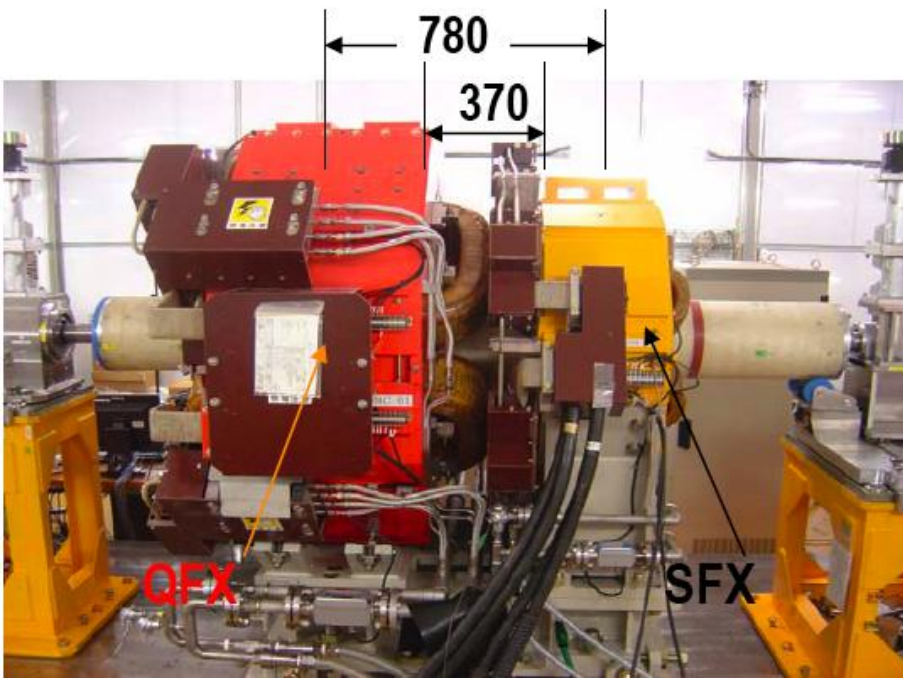
- Commissioned LINAC on January 2007 (181MeV)
- Commissioned RCS (3GeV) on October 2007 with low beam power (beam dump limits of 4kW)
 - Accelerated 1.1×10^{13} protons in MD (130kW)
- Main Ring (50GeV) commissioning started on May 2008
 - Transferred the beam to an injection dump.
 - The beam circulated with RF off
 - The beam was RF-captured, turned 1000 times, and was extracted from MR to the dump
 - Cleared authority's radiation inspection with 3.64sec repetition. Continuous operation more than 3 hours with a beam power of around 60 W



Fringe field interference

M. Kinsho, J-PARC

- High-order multi-pole components due to fringe-field interference of closely spaced magnets (see also SNS accumulator ring study)
- Allowed amplitude of multipoles 2×10^{-3} for sufficiently large dynamic aperture

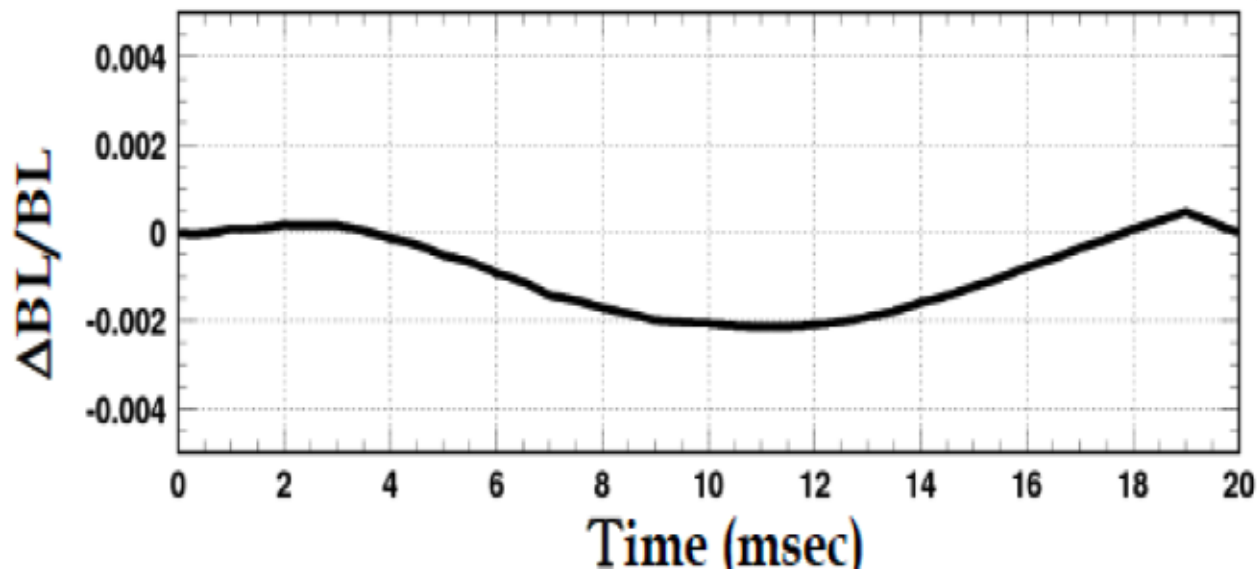


Time variation of 4-pole component

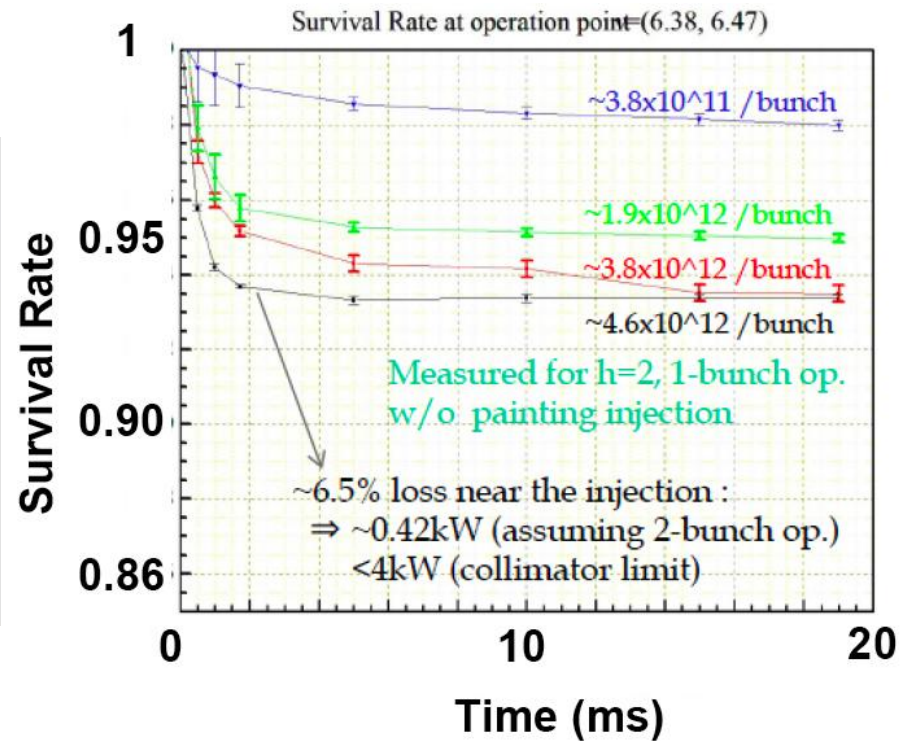
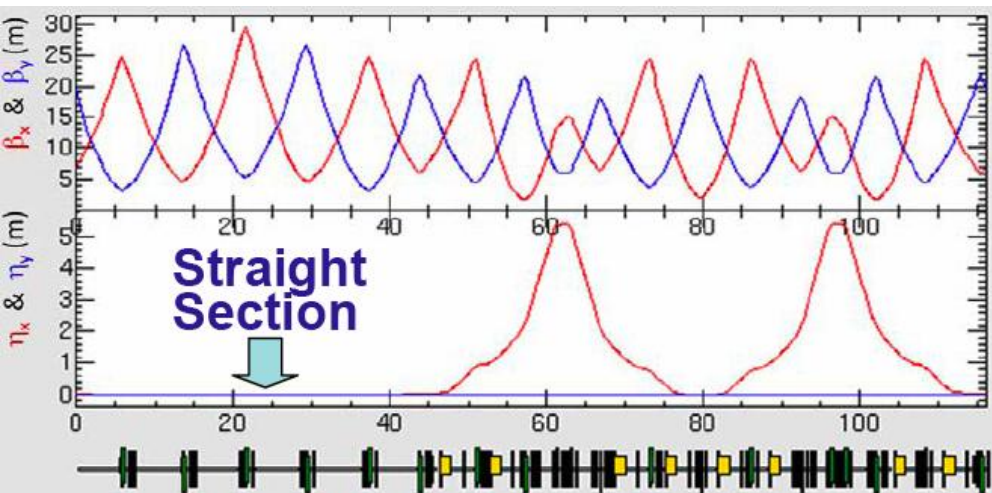
Magnetic field tracking

M. Kinsho, J-PARC

- 8 independent resonant circuits (7 for quadrupoles)
- For precise control for field tracking IGBT are used due to the fast switching characteristics
- A 10^{-3} accuracy is achieved
- A lot of effort to eliminate electromagnetic noise due to fast switching



Beam losses



- Transition free lattices
 - In RCS, extraction energy below transition energy ($\sim 9\text{GeV}$)
 - In MR, imaginary transition energy lattice
- No beam loss observed during acceleration in RCS
 - 6.5% of beam loss during injection (but no painting yet)
 - Collimators can absorb 4kW

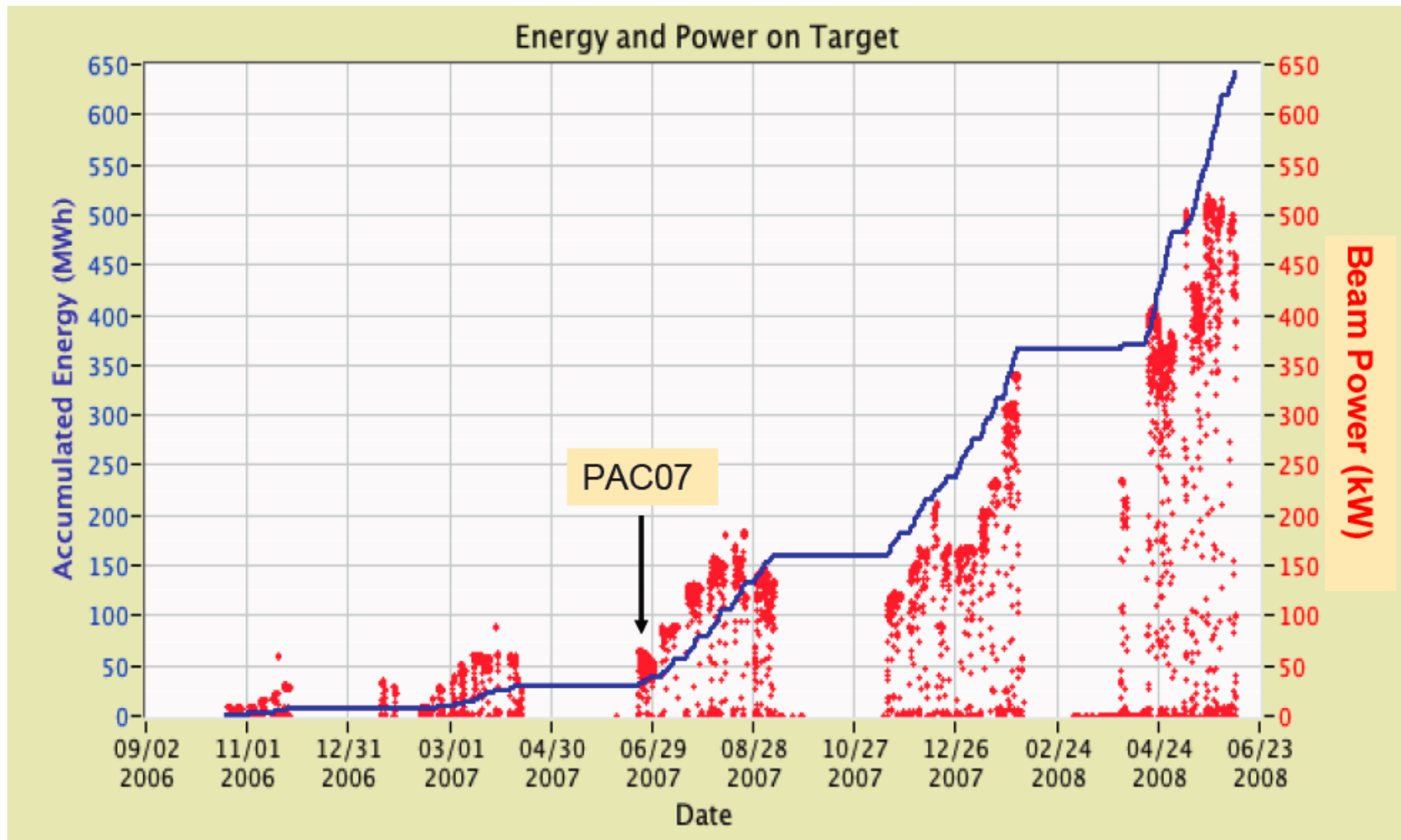
Future commissioning plans

- MR will continue its commissioning on December 2008
- The detailed plan will be communicated in the following months
- The PS2 team is welcome to participate in the commissioning of MR
 - Contacts in J-PARC: Y. Yamazaki and M. Kinsho)

SNS progress

S. Henderson, SNS

- Beam power reached world record of 0.5MW
- Achieved in MD record beam intensity of $1.3 \times 10^{14} p$



SNS progress II

S. Henderson, SNS

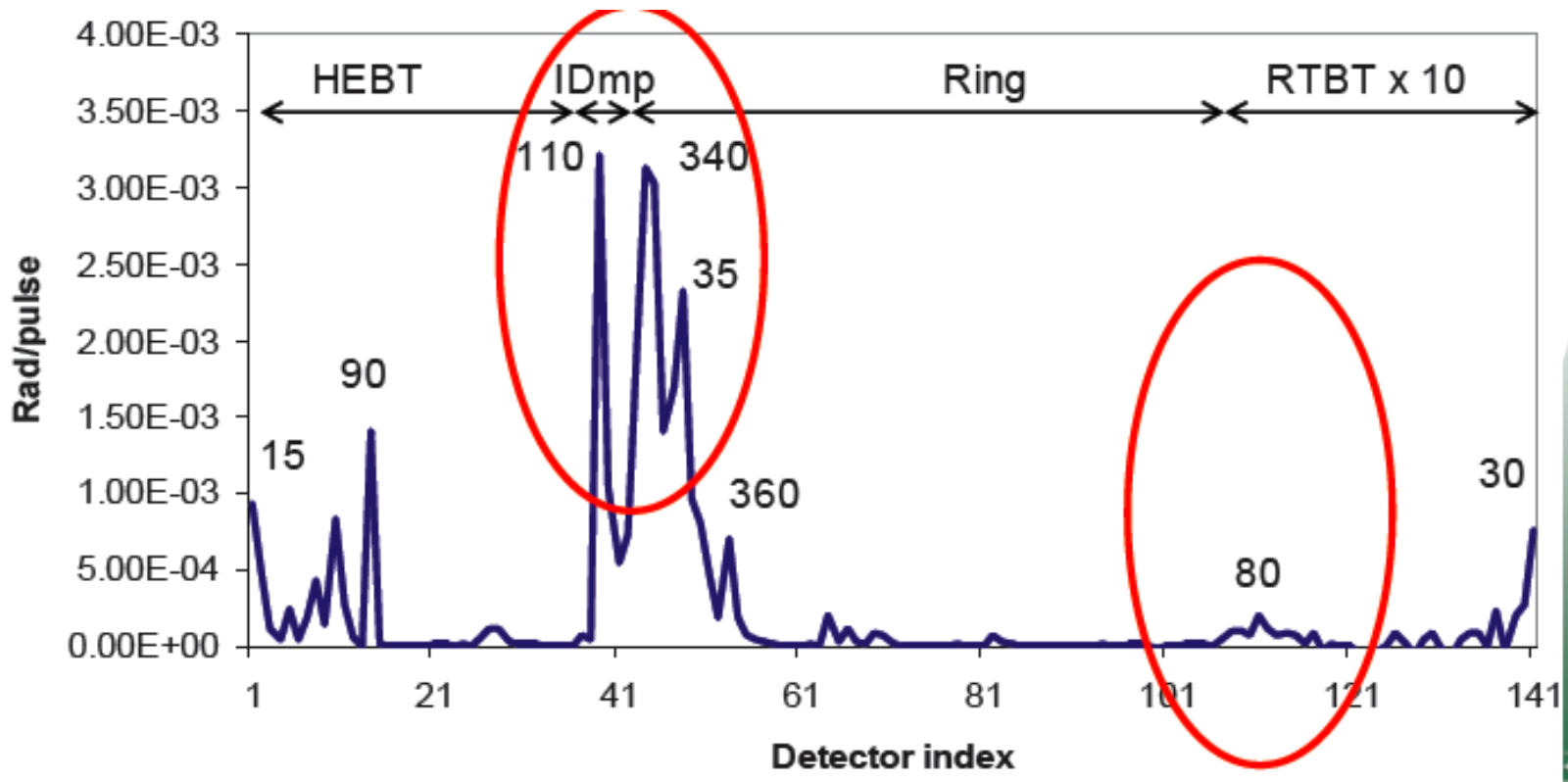
- Still some way to go until nominal parameters are reached

	Design	Operation
Kinetic Energy	1.0 GeV	0.88 GeV
Beam Power	1.44 MW	0.52 MW
Linac Beam Duty Factor	6%	3%
Modulator/RF Duty Factor	8%	4%
Peak Linac Current	38 mA	32 mA
Average Linac Current	1.6 mA	0.57 mA
Linac pulse length	1.0 msec	0.5 msec
Repetition Rate	60 Hz	60 Hz
SRF Cavities	81	75
Ring Accumulation Turns	1060	530
Ring Current	25 A	9 A
Ring Bunch Intensity	1.5×10^{14}	0.5×10^{14}
Ring Space Charge Tune Spread	0.15	0.05

SNS main challenge: beam losses

S. Henderson, SNS

- Losses mainly in CCL DTL transition (off-energy particles), accumulator ring injection (waste beam handling and foil) and extraction (poor chopping)



Collaboration with US

- Discussion with U. Wienands (US-LARP coordinator for PS2)
- Mainly concentrated on finding contact persons in US labs for the different collaboration activities for PS2
 - SLAC (Y. Cai) is interested in contributing in lattice design and e-cloud + collective effects
 - Fermilab may be interested on space-charge, RF design
 - A lot of expertise in different fields from the SNS team (injection/extraction, collimation, etc.) but not a LARP laboratory
- Uli will communicate a detailed list (with names, commitments) in the following months