WGD Summary

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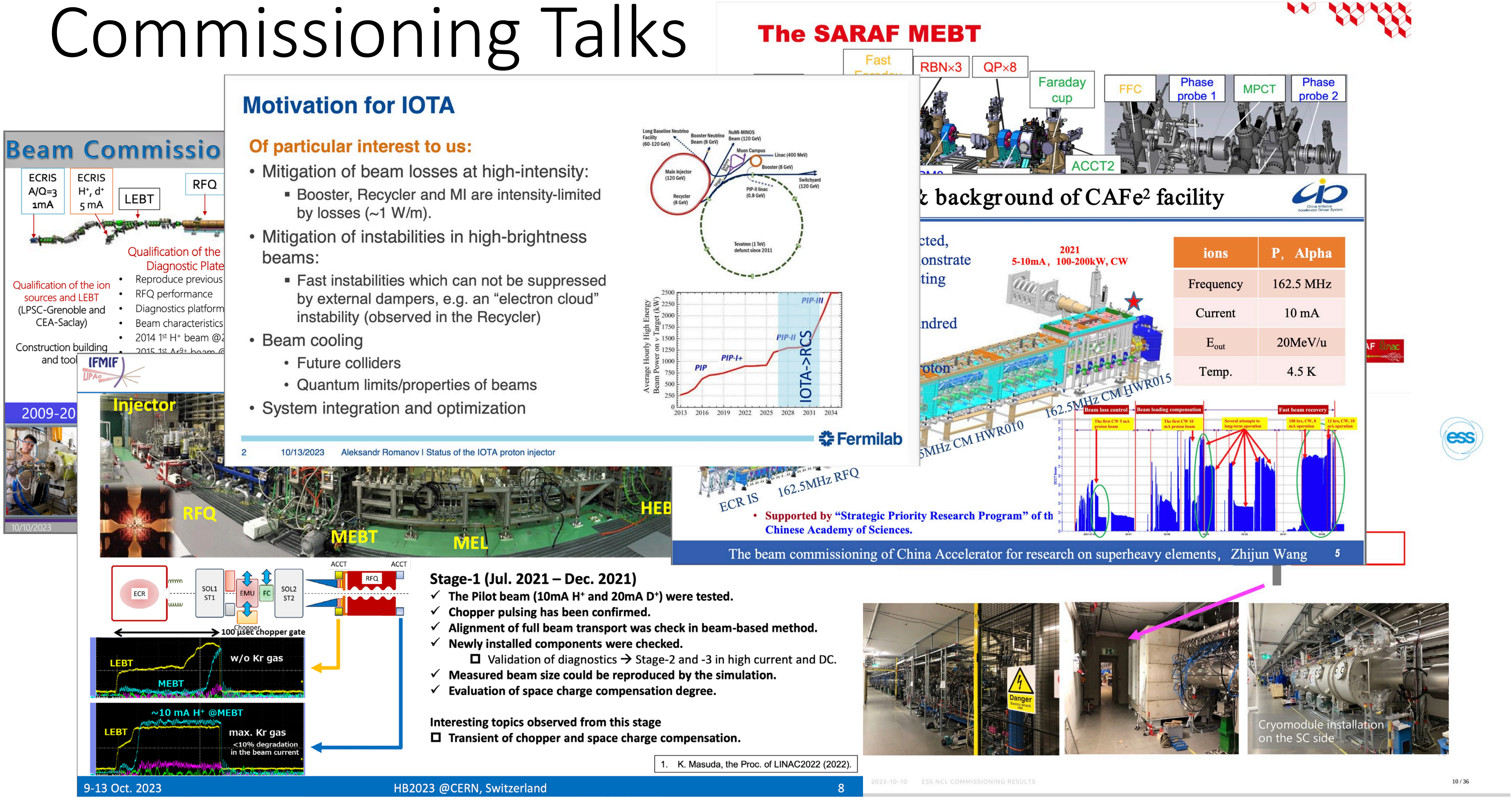
Some numbers to start

- 17 talks
  - 12 invited
  - 5 contributed
- Topics:
  - 7 Facility Commissioning/Status
  - 4 Facility Upgrade plans
  - 6 Operational aspects/Optimization for operations

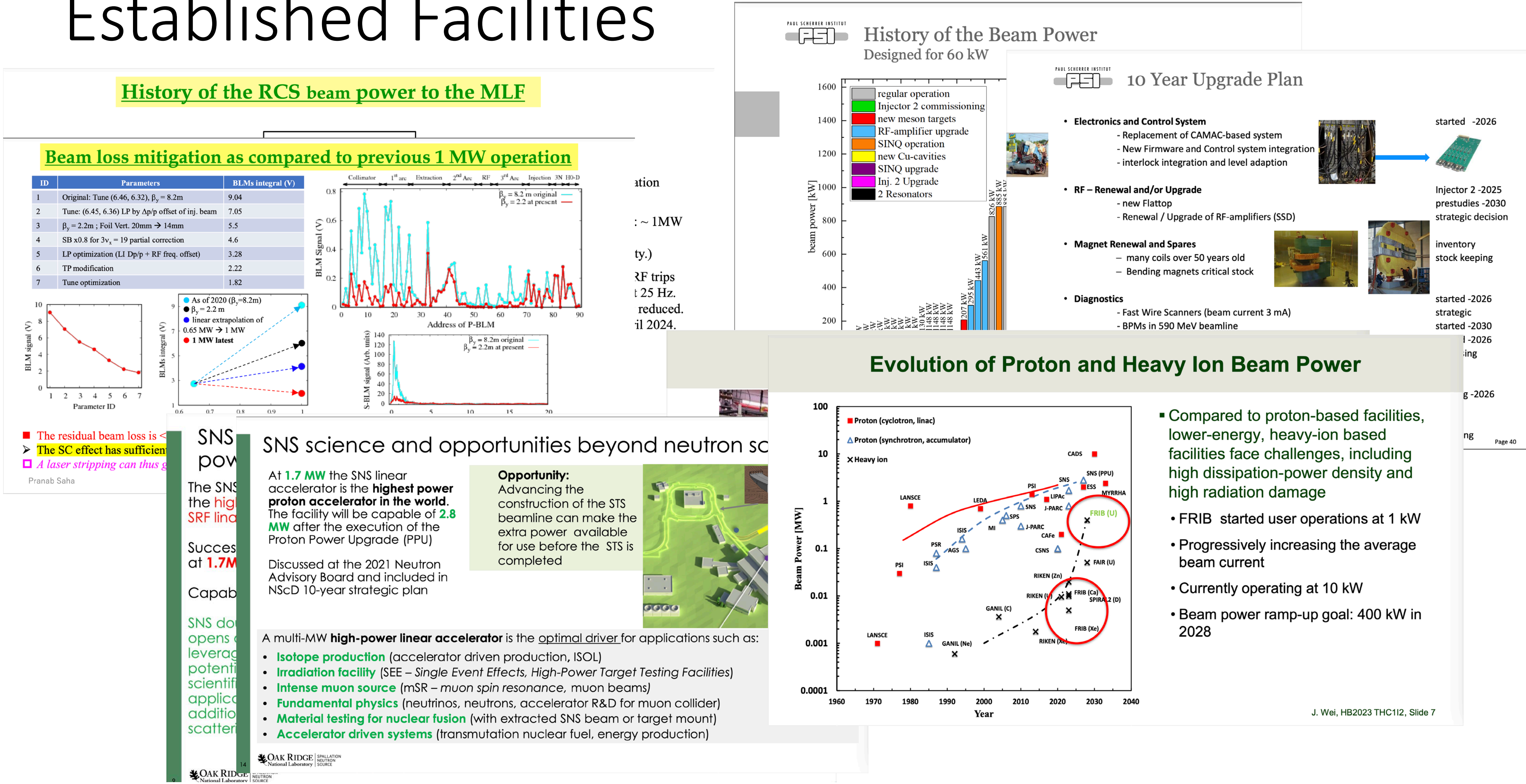
Commissioning Talks



Commissioning Talks

- Many facilities under commissioning or just out of it.
- Characterizing the machine at this early stage is important.
    - Knowledge of the dynamics + Diagnostics
    - How close/good is the machine model with respect to reality?
    - Longitudinal tuning is key (Linacs/low energy machines)
- Unforeseen events:
    - Scattering on beam dump
    - Phase oscillations for different beam currents

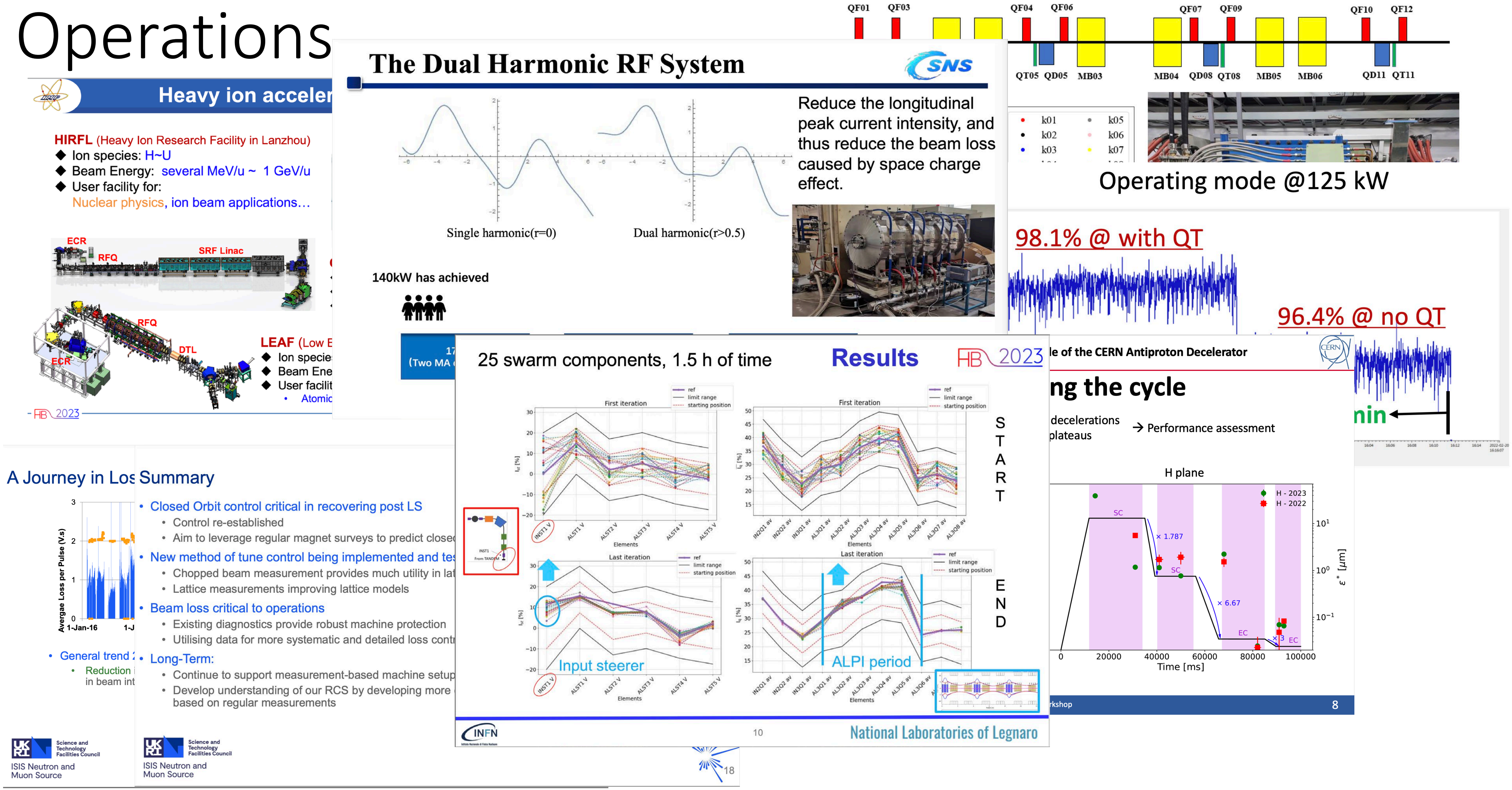
Established Facilities



Established Facilities

- There is a lot of drive to push machines beyond their original design power:
  - Upgrades and pushing the envelope: SNS, FRIB, JPARC and PSI
- Reduction of losses is the main concern and a lot of work done towards this goal:
  - Better understanding of transverse dynamics (instabilities and resonances)
  - Space charge and chromaticity tunes shifts
  - Optimization of working points and tuning (symmetry of the lattices and tunes)
  - Better understanding of your model vs real machine
- For user machines Reliability is also key
  - Combination of machine knowledge and experience
  - Fine balance between conservative goals and pushing the machine performance

Operations


Heavy ion acceler
HIRFL (Heavy Ion Research Facility in Lanzhou)
Ion species: H~U
Beam Energy: several MeV/u ~ 1 GeV/u
User facility for:
Nuclear physics, ion beam applications…
ECR
RFQ
SRF Linac
RFQ
DTL
ECR
LEAF (Low E
Ion specie
Beam Ene
User facilit
Atomic
HB 2023
The Dual Harmonic RF System
SNS
Single harmonic(r=0)
Dual harmonic(r>0.5)
Reduce the longitudinal peak current intensity, and thus reduce the beam loss caused by space charge effect.
140kW has achieved
(Two MA
QF01
QF03
QF04
QF06
QF07
QF09
QF10
QF12
QT05
QD05
MB03
MB04
QD08
QT08
MB05
MB06
QD11
QT11
k01
k02
k03
k05
k06
k07
Operating mode @125 kW
98.1% @ with QT
96.4% @ no QT
25 swarm components, 1.5 h of time
Results
HB 2023
First iteration
Last iteration
ref
limit range
starting position
Elements
START
END
Input steerer
ALPI period
INFN
10
National Laboratories of Legnaro
le of the CERN Antiproton Decelerator
ng the cycle
decelerations
plateaus
→ Performance assessment
H plane
H - 2023
H - 2022
SC
EC
× 1.787
× 6.67
Time [ms]
rkshop
8
A Journey in Los
Avergae Loss per Pulse (V.s)
1-Jan-16
General trend
Reduction
in beam int
Summary
Closed Orbit control critical in recovering post LS
Control re-established
Aim to leverage regular magnet surveys to predict closed
New method of tune control being implemented and tes
Chopped beam measurement provides much utility in lat
Lattice measurements improving lattice models
Beam loss critical to operations
Existing diagnostics provide robust machine protection
Utilising data for more systematic and detailed loss contr
Long-Term:
Continue to support measurement-based machine setup
Develop understanding of our RCS by developing more based on regular measurements
Science and Technology Facilities Council
ISIS Neutron and Muon Source
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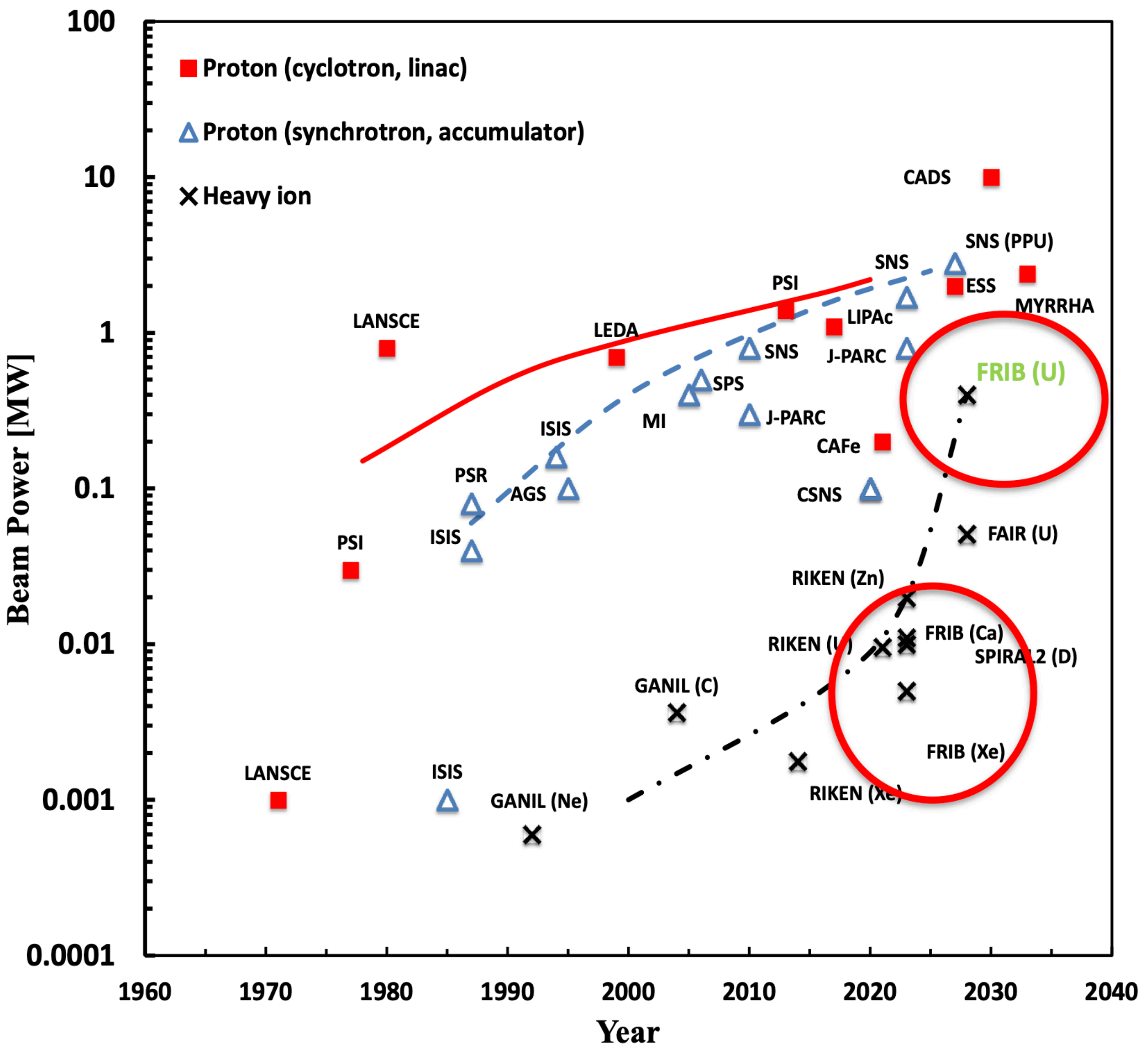
Operations

- Reliability again is the word.
- Ensure you have the relevant data available (comparison with past performance, evolution on the machine and equipment, etc).
- Ensure you have the right diagnostics to the job, that is key to performance improvement and operations.
- Right people to do the job (training and knowledge transfer is important).



Proton (cyclotron, linac)
Proton (synchrotron, accumulator)
Heavy ion
100
10
1
0.1
0.01
0.001
0.0001
Beam Power [MW]
1960
1970
1980
1990
2000
2010
2020
2030
2040
Year
CADS
SNS (PPU)
SNS
PSI
ESS
MYRRHA
LIPAc
LANSCE
LEDA
SNS
J-PARC
FRIB (U)
SPS
MI
J-PARC
ISIS
CAFe
PSR
AGS
CSNS
PSI
ISIS
FAIR (U)
RIKEN (Zn)
FRIB (Ca)
SPIRAL2 (D)
GANIL (C)
FRIB (Xe)
LANSCE
ISIS
GANIL (Ne)

Thank you!