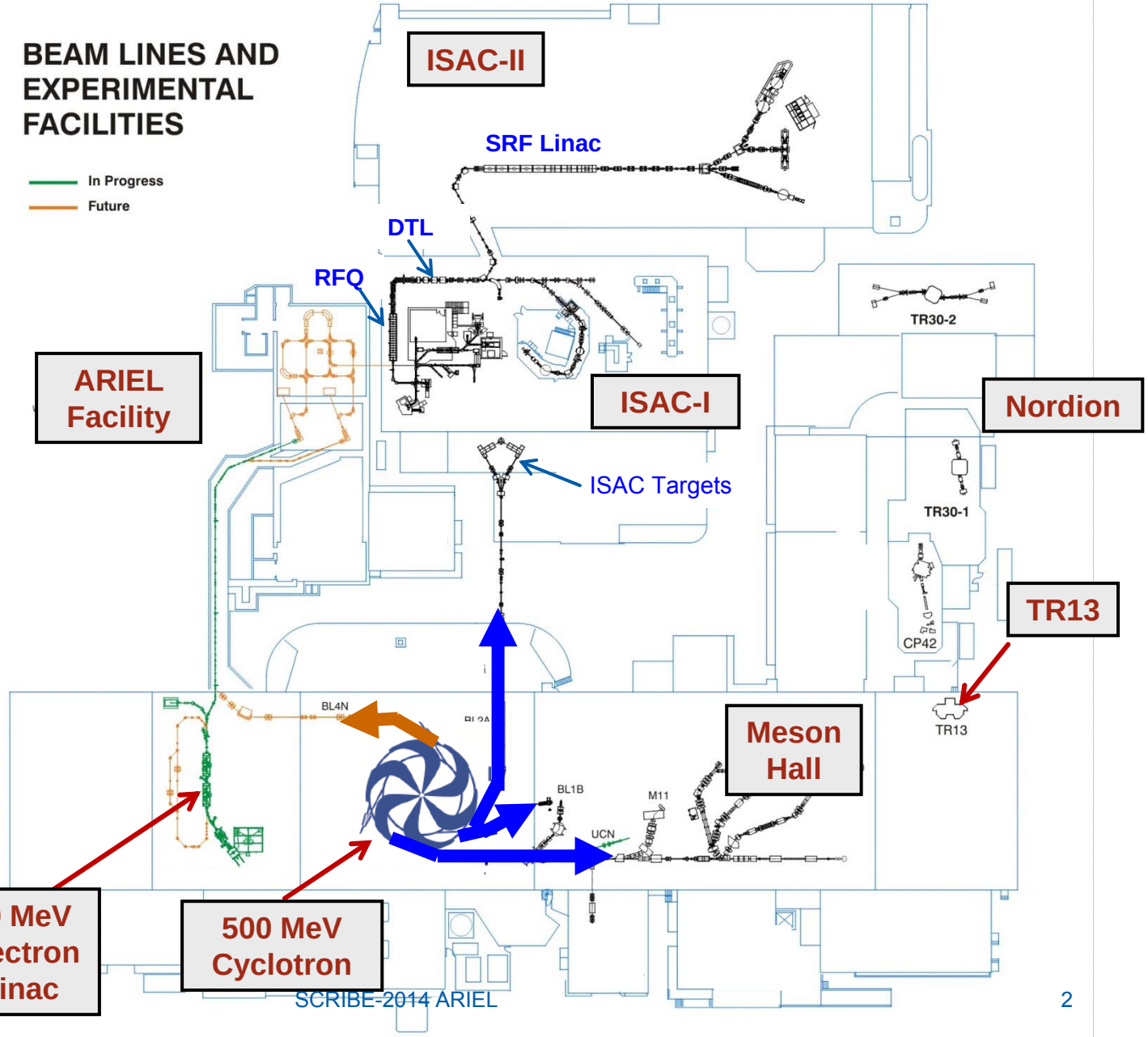
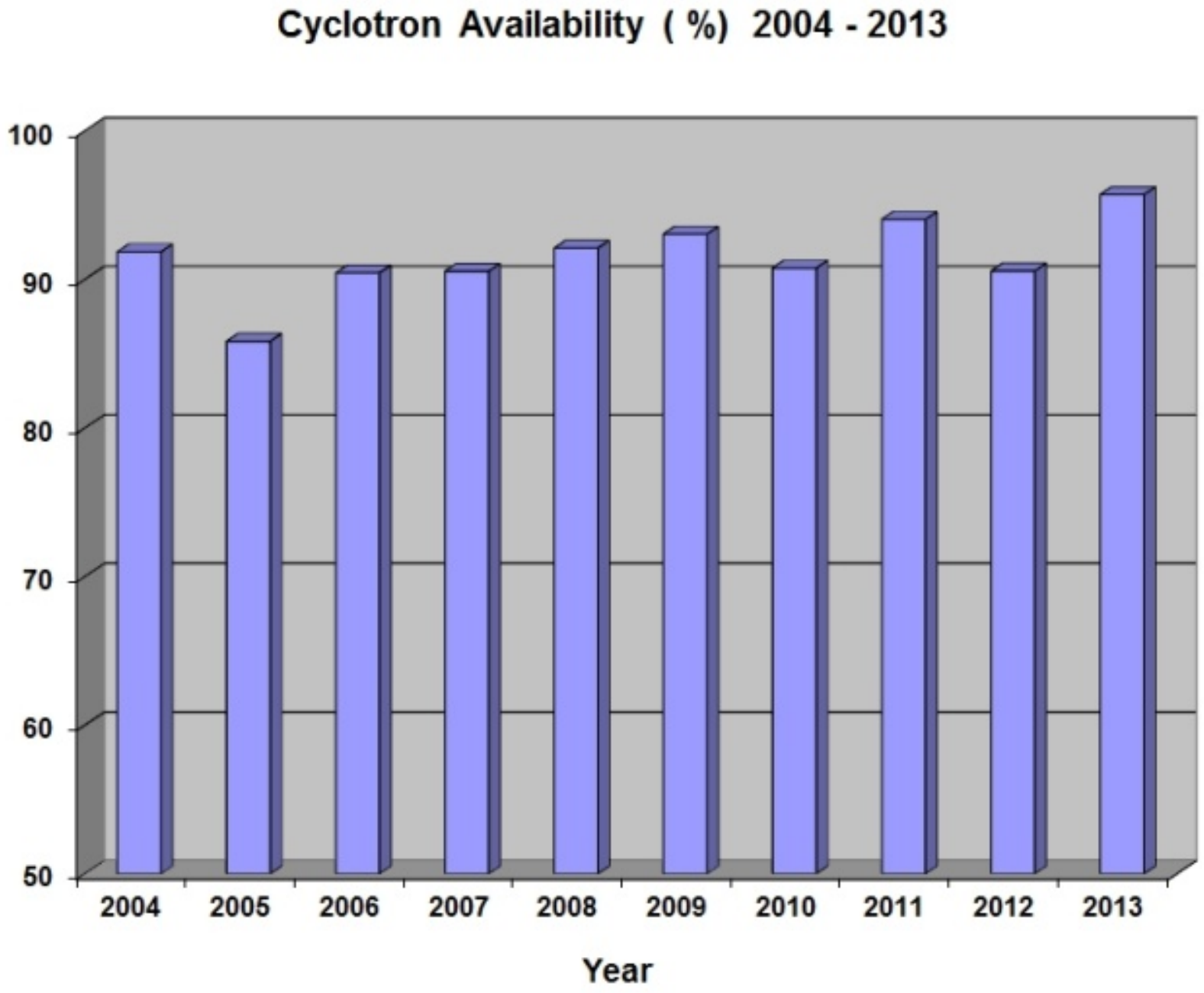
TRIUMF Accelerators

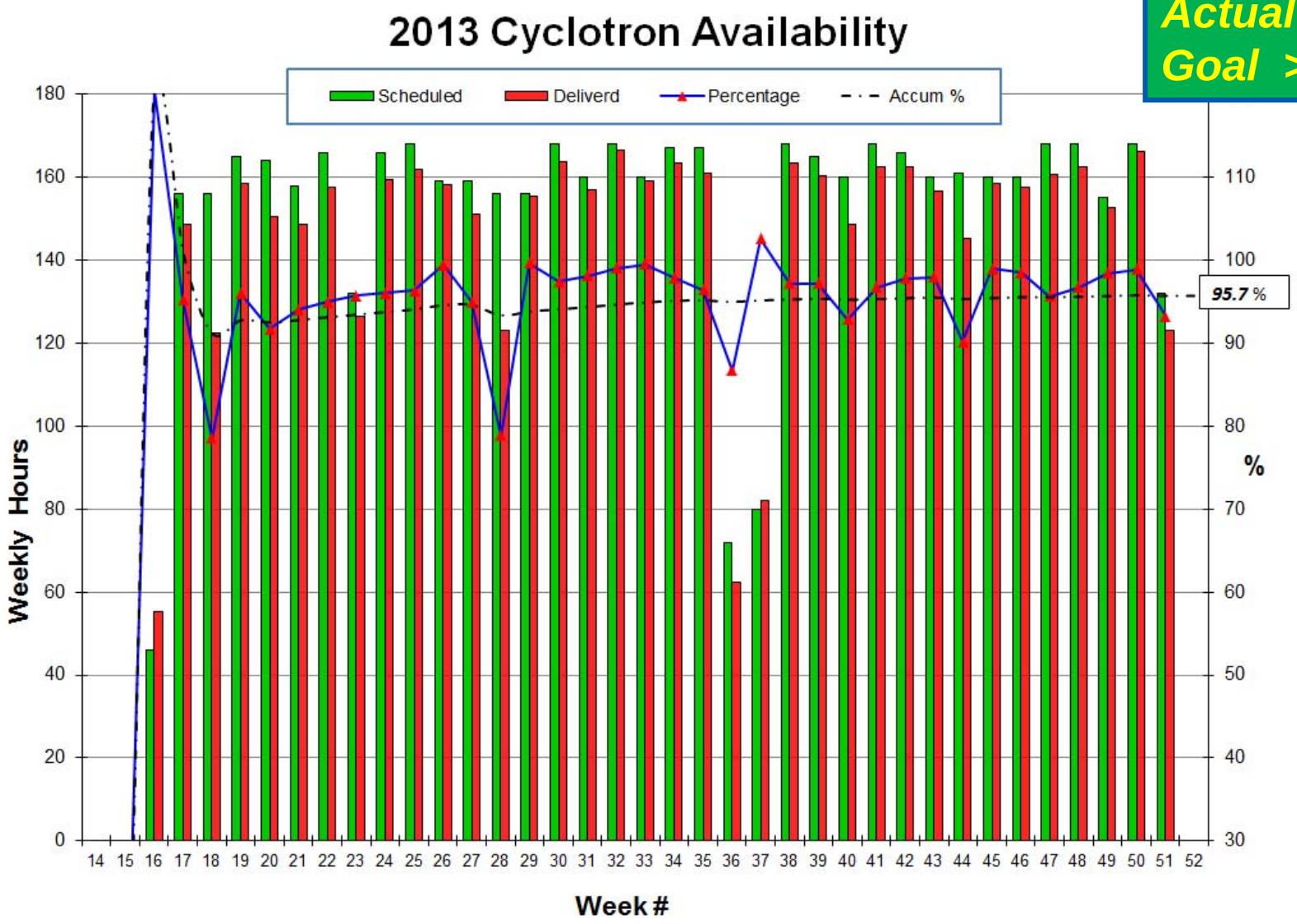
- 500MeV H^- cyclotron since 1974
- Only ISOL facility in North America
- Highest power Isotope Separation On-Line (ISOL) facility worldwide
- ISOL with > 5 MeV/u accelerated beams
- Adding 50MeV 500kW e-Linac



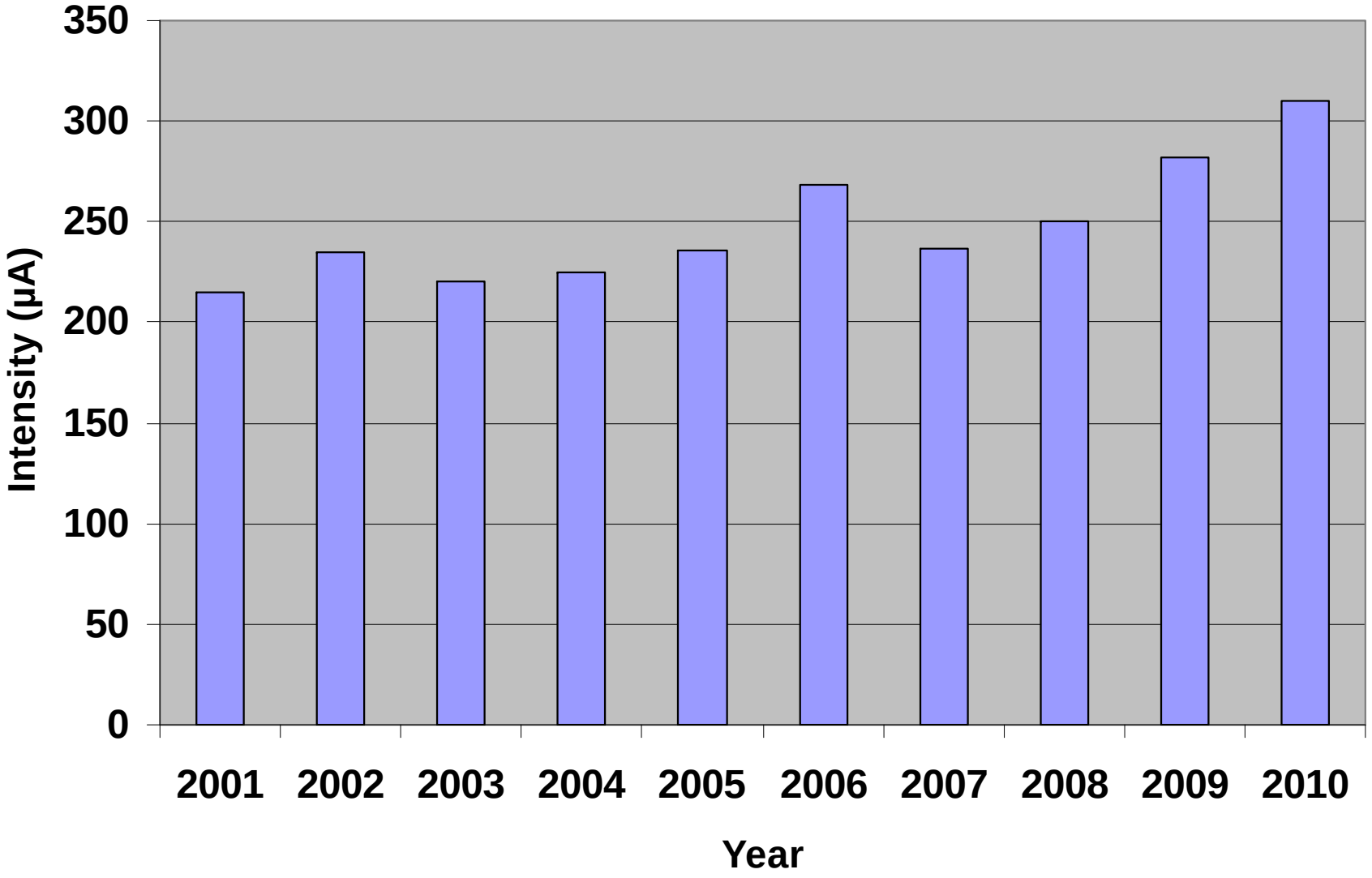

Cyclotron Availability (%) 2004 - 2013
100
90
80
70
60
50
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Year

Cyclotron Availability in 2013

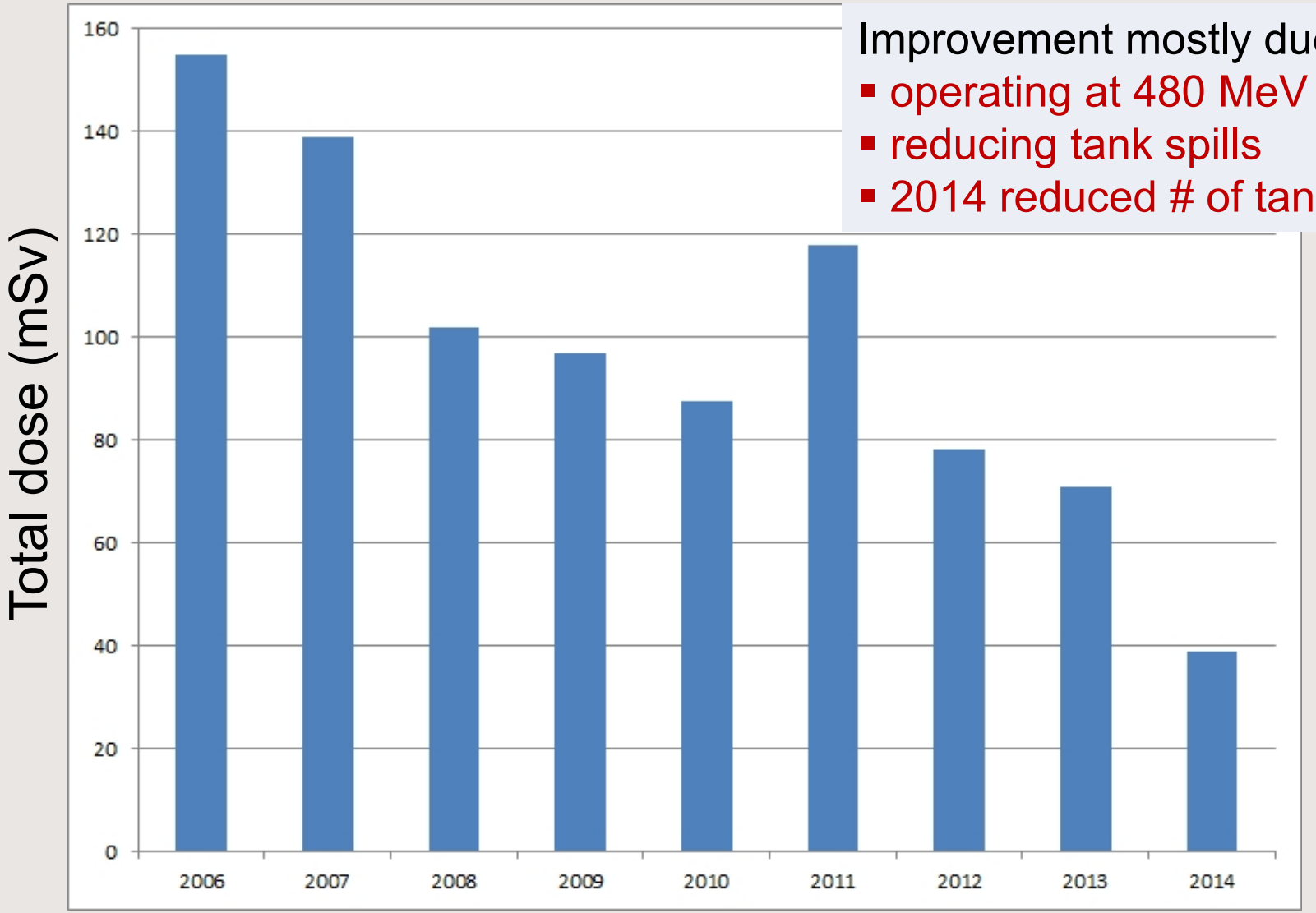
Availability :
Actual 95.7%
Goal >90%



Cyclotron Annual Peak Production



Dose during Shutdowns

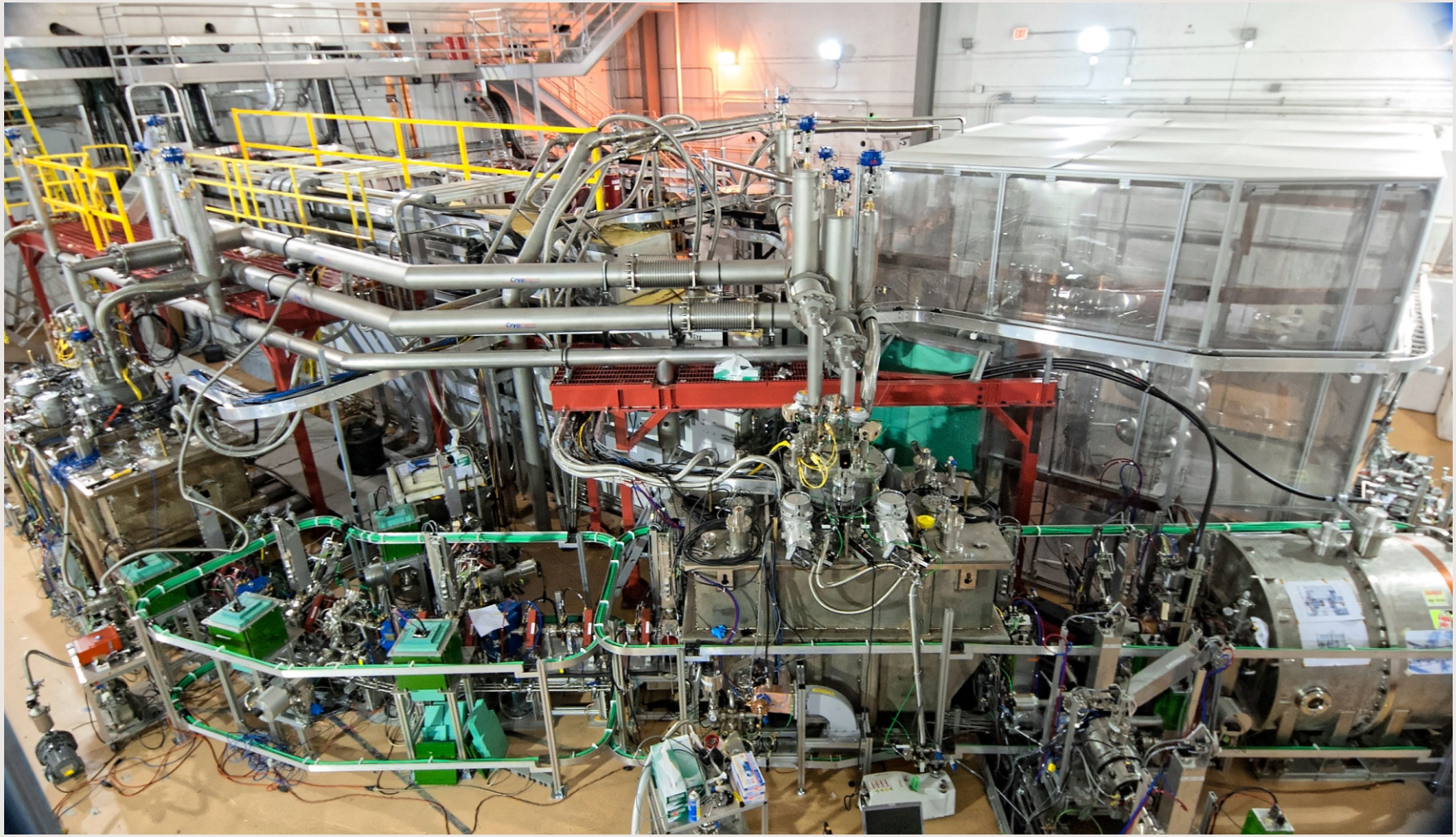


Improvement mostly due to:

- operating at 480 MeV
- reducing tank spills
- 2014 reduced # of tank jobs

ARIEL: Advanced Rare IsotopE Laboratory

ARIEL e-linac



ISIS New Vertical Injection Line

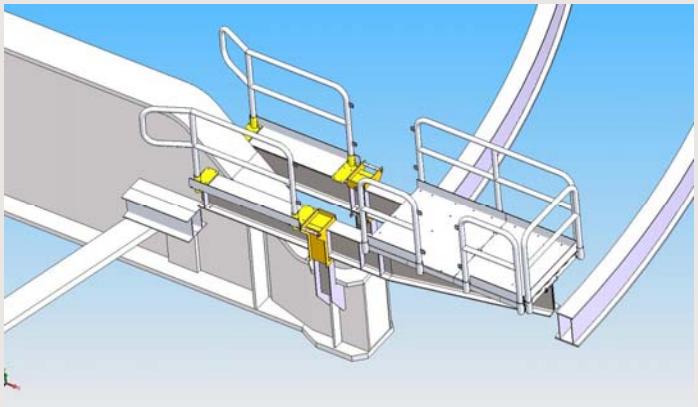
3-year project, successfully completed in May 2011

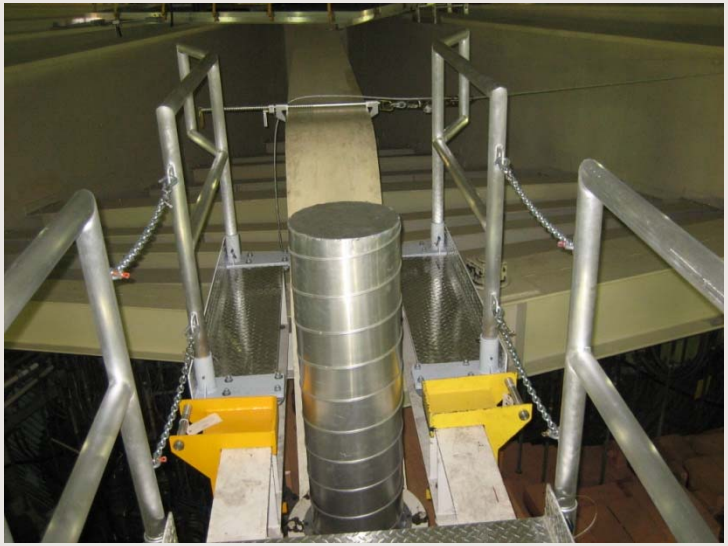
Trim and Harmonic Power Supplies

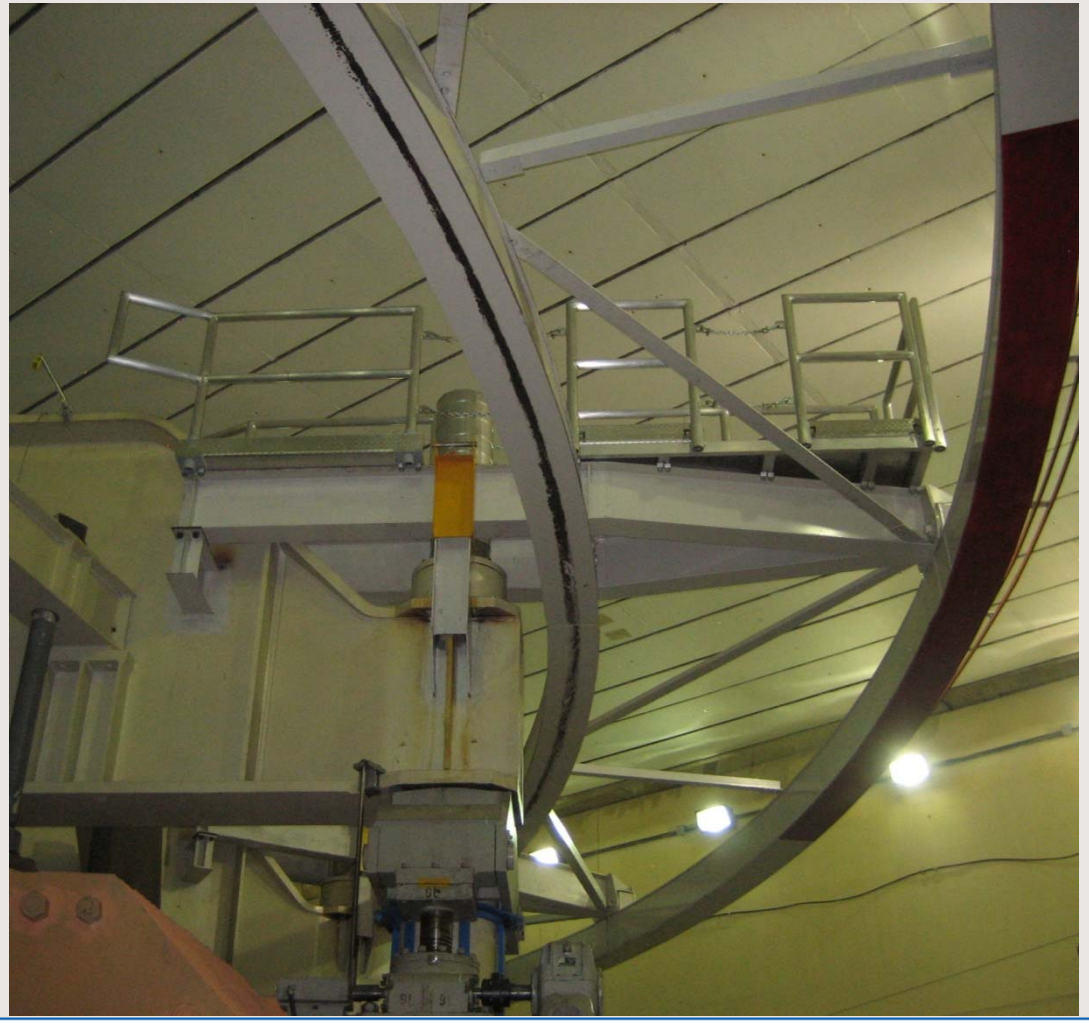
Upgrade was completed in 2 winter shutdowns, initially a 5-year project

Vault Cabling Project

Cyclotron Upper Bearing Maintenance Fall Protection System

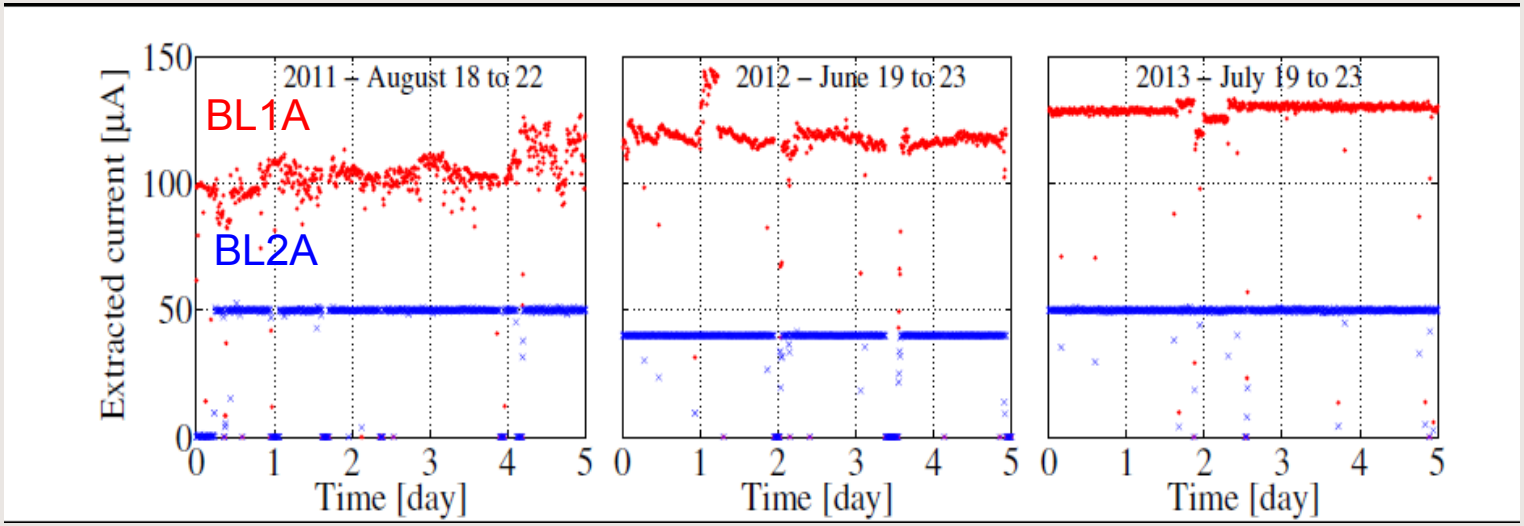






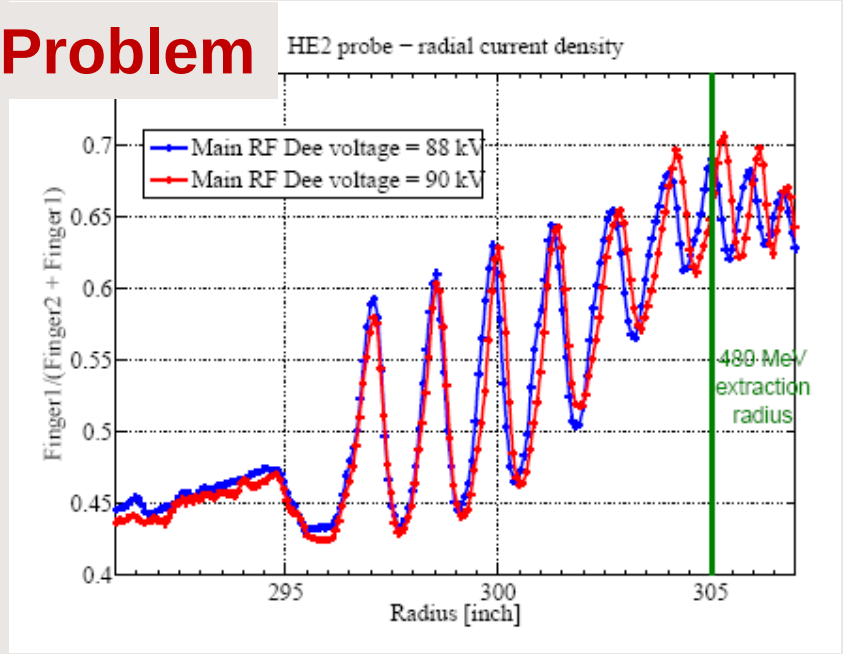
Cyclotron Beam Developments

- Achieved beam intensity stability ±1% in BL2A and ± 2% in BL1A by suppressing ν_r = 3/2 resonance, and introducing active regulation



3/2 Resonance Correction in the Cyclotron

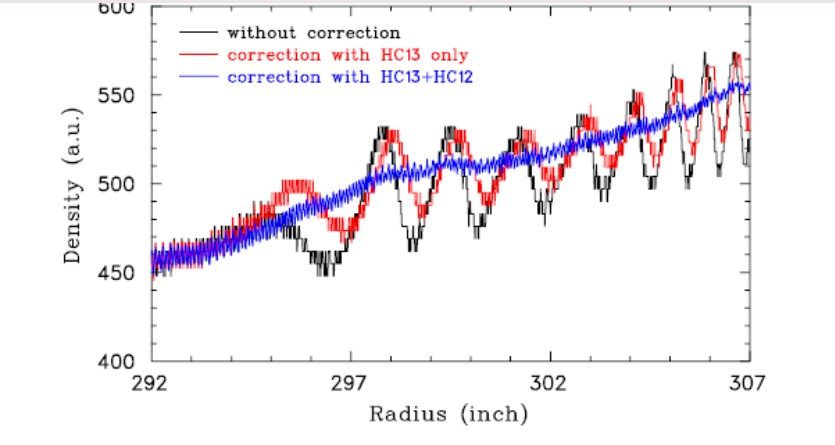
Problem



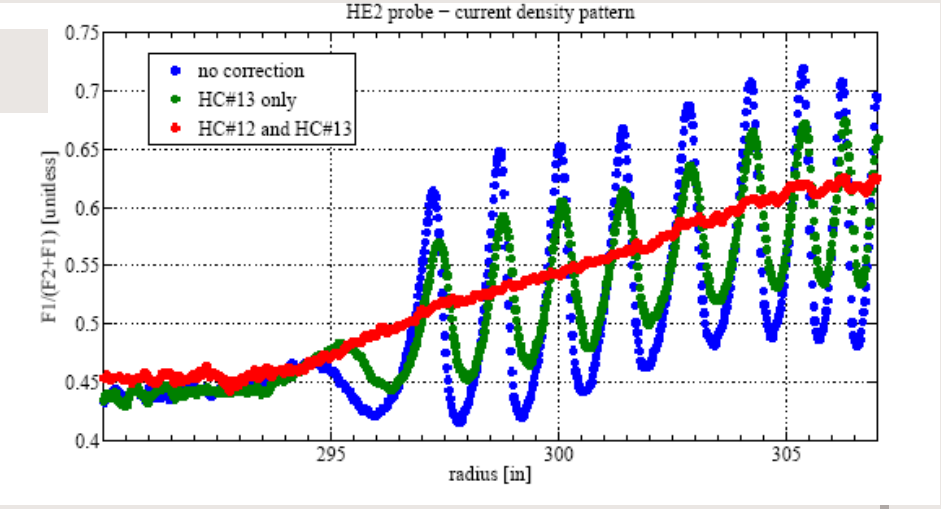
Problem: Radial variation of the current density was strongly modulated due to 3/2 resonance crossing.

Solution: A linear combination of two HCs, displaced azimuthally, provided full correction.

Resonance correction: Simulation



Resonance correction: Measurements



Cyclotron Main Magnet Power Supply

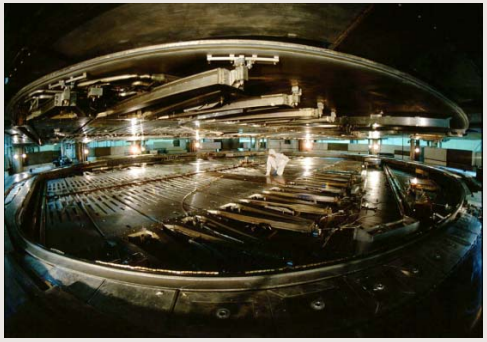
Number 1 item based on Risk Assessment analysis of accelerator infrastructure

The Ancient Spartan youth pledge

“ἀμμες δε γ' εσόμεθα πολλώ κάρρονες”

Πλούταρχος, Λυκούργος, 21

“we shall become much better (than you)”



TRIUMF

Canada's national laboratory for particle and nuclear physics
Laboratoire national canadien pour la recherche en physique nucléaire
et en physique des particules

Thank you!
Merci!

TRIUMF: Alberta | British Columbia | Calgary | Carleton | Guelph | Manitoba | McMaster | Montréal | Northern British Columbia | Queen's | Regina | Saint Mary's | Simon Fraser | Toronto | Victoria | York

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