Science and Technology Facilities Council

ISIS Neutron and Muon Source

TUPOJO21

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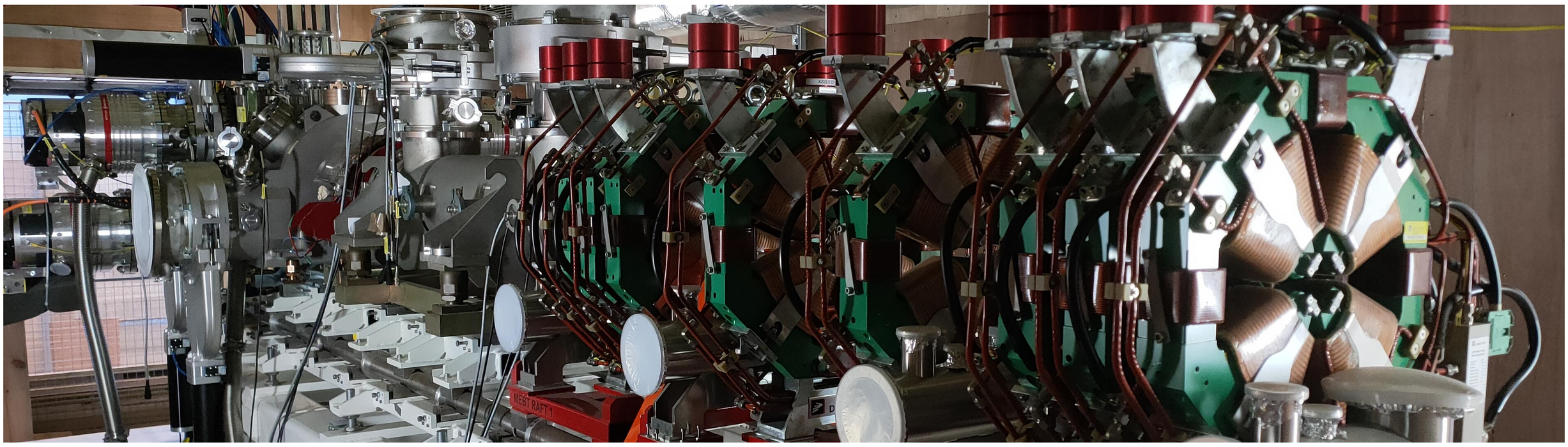
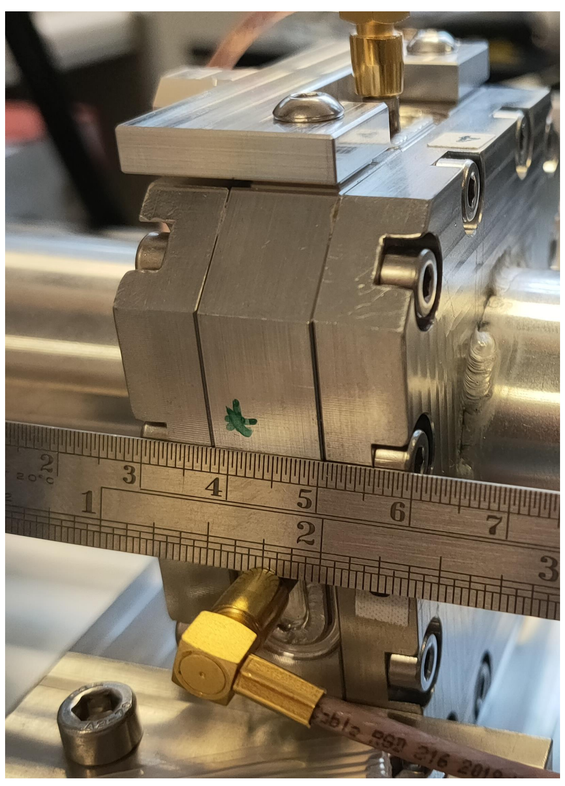
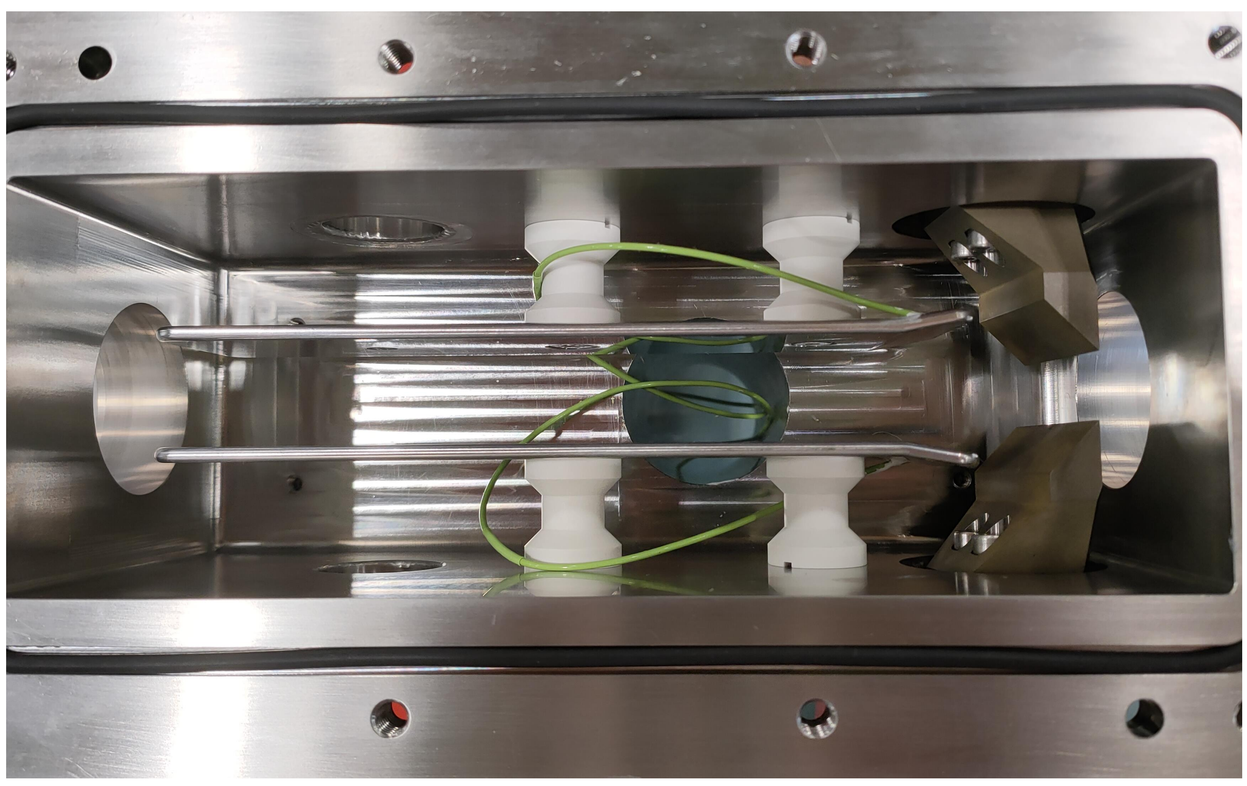
Pre-injector Upgrade for the ISIS H⁻ Linac



- Present ISIS linac loses 50% of beam from ion source to synchrotron
- Install medium energy beam transport (MEBT) between RFQ and DTL
- Less beam-loss → less H⁻ beam required from ion source → change to RF technology

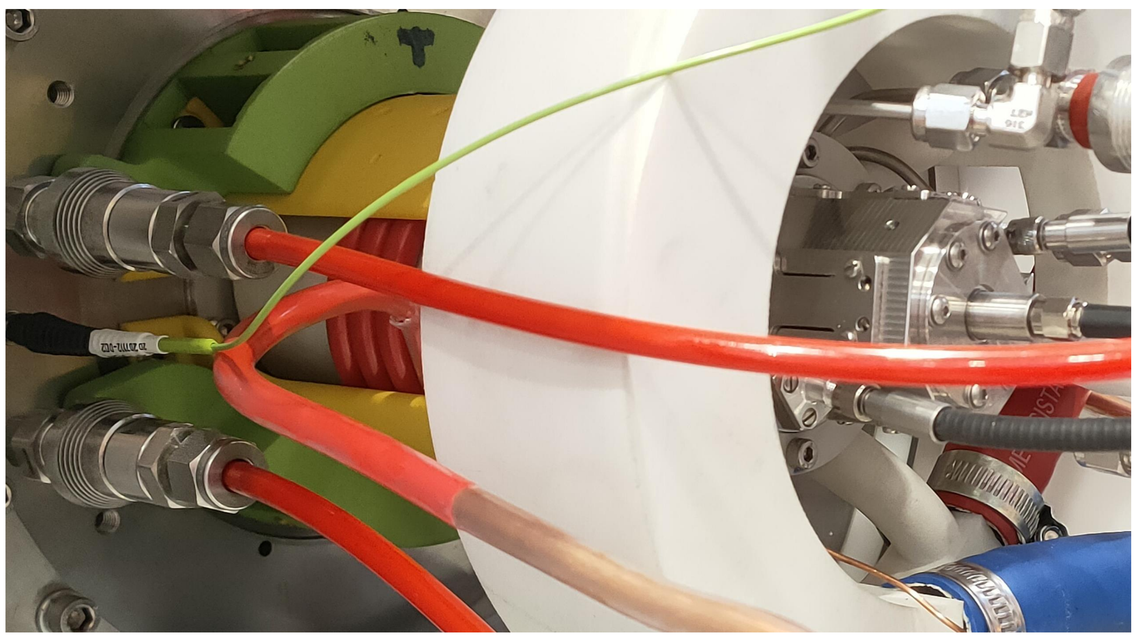


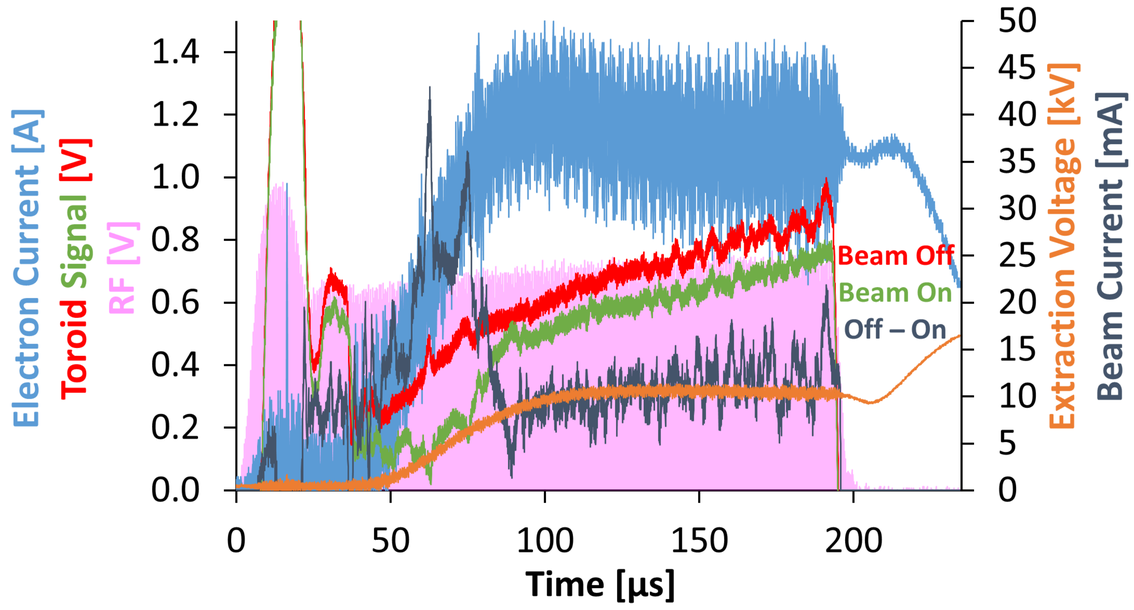
Beam Position Monitor



Chopper

Re-bunching Cavity





Non-caesiated, external RF-coil H⁻ ion source:

- 50 Hz, 1 ms, 70 kW RF, variable 1.8-4.0 MHz
- Adjustable permanent magnet filter field
- Very low-power ignition gun
- 3D-printed components
- No plasma facing parts → long lifetime

First extracted beam pulse! Next steps:

- Ion source emittance scans
- LEBT and RFQ commissioning
- Beam through MEBT and chopper studies
- One-year soak-test of entire accelerator
- Transfer to ISIS for improved performance