FIDUCIALIZATION OF THE CRYOMODULES FOR THE NSCL REACCELERATOR PROJECT

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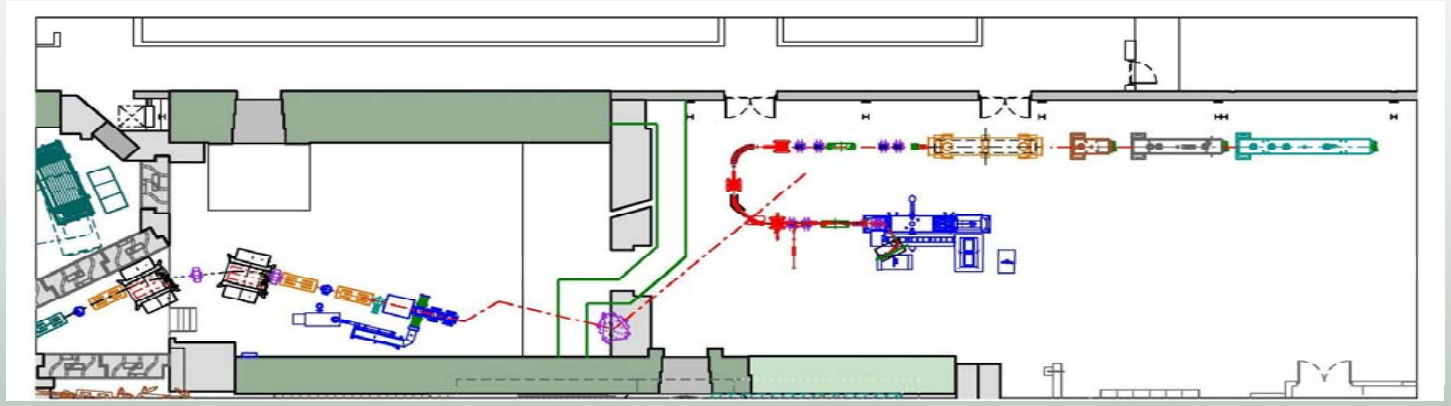
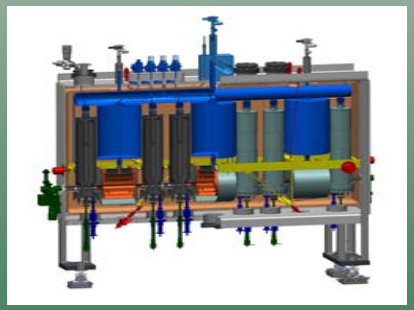
Abstract: The National Superconducting Cyclotron Laboratory will be constructing a rare isotope beam stopping and reacceleration facility. This poster describes the proposed fiducialization and alignment plan for the superconducting RF linear accelerator modules.

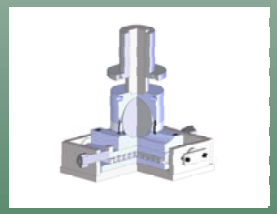


The NSCL is developing a prototypical facility to demonstrate the technical feasibility and performance characteristics for stopping and reaccelerating beams of rare isotopes produced and separated in flight, as an important step towards a next-generation rare-isotope facility in the United States. Exotic beams produced by in flight fragmentation of primary beams from the K500 and K1200 cyclotrons enter from the left in the above figure and are stopped by a linear gas cell. After extraction, the ion charge state is increased in an Electron Beam Ion Trap, shown in blue above. The beam from the trap is focused through a magnetic and electrostatic analysis beamline to a Radio Frequency Quadrupole and Superconducting Linear Accelerator for acceleration to 3 MeV per nucleon.



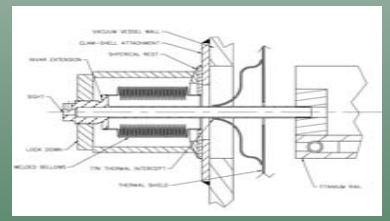
β=0.041 Linac Cryomodule

This cryomodule contains three superconducting 9-tesla solenoids and six superconducting RF cavities. The cryostat is supported by three orthogonal adjusters



Support Stand Orthogonal Adjuster

The orthogonal adjuster uses an ACME screw with an 88.9mm spherical joint riding in a concave slot. A set of 12.7 mm bearings support a plate, adjusted horizontally by ACME screws with ball transfers to constrain motion transverse to the adjustment direction.



Horizontal link design

The positions of the solenoids and cavities are aligned to a titanium rail structure inside the cryostat. The position of the rail is transferred to the outside via the horizontal Invar36 links. SMR pin nests for the laser tracker are mounted to the end of the links at six locations. During cooldown, the link is free to move with the contraction of the vertical links. The final horizontal centering of the components is adjusted with the lock down.

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