



RF Distribution

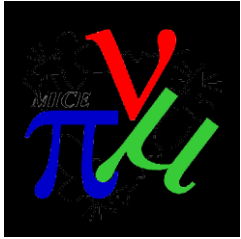
Alan Grant

Recommendation from Review Panel

- RF Distribution
- Coax high power phase shifters not warranted.
- Relocate Hybrid splitters from behind shield wall.
 - Provides more space for access to amplifiers.
 - Reduces the length and volume of 4" coax.
- Were possible reduce number of coaxial joints.

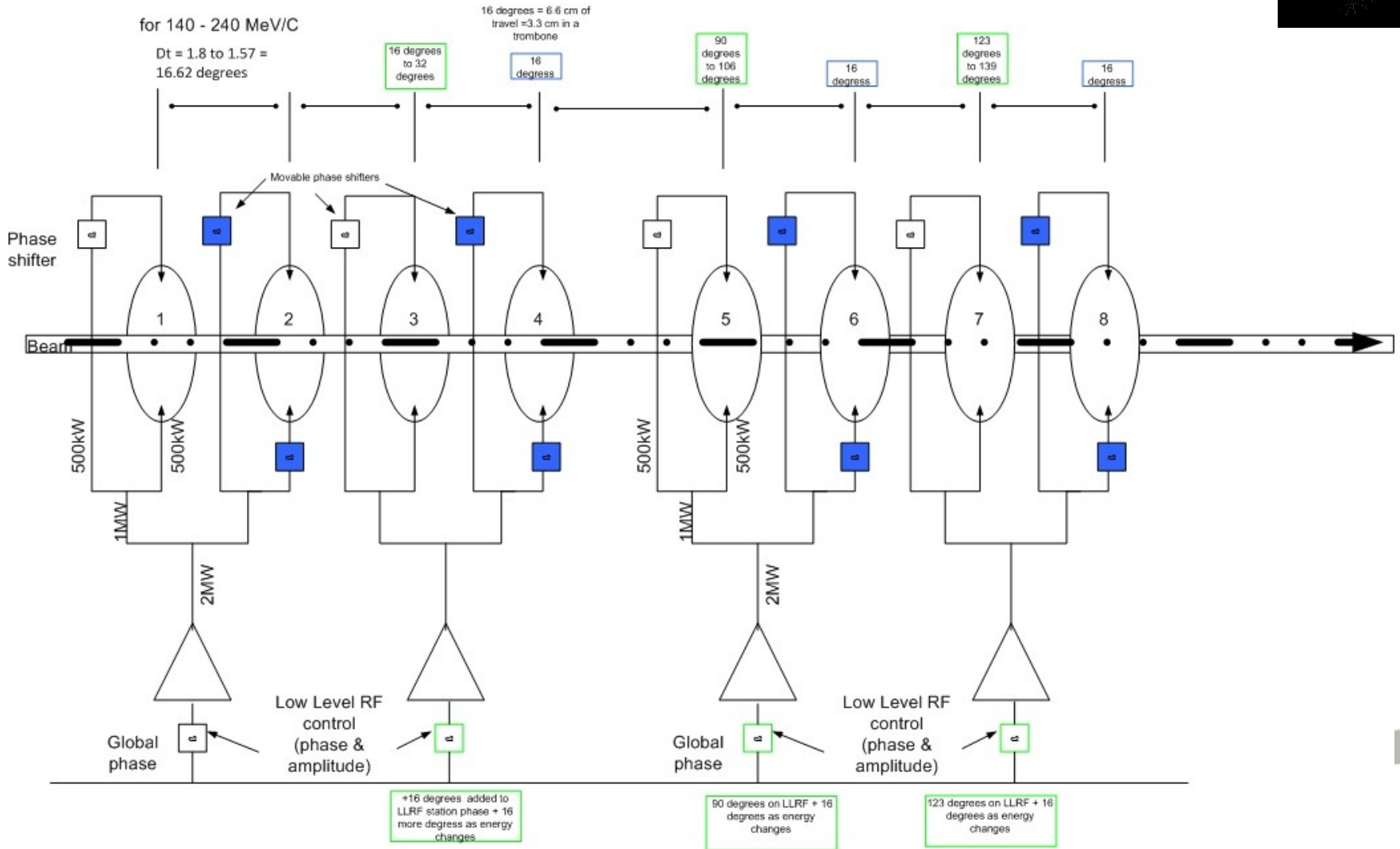
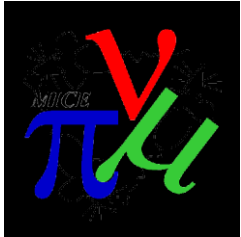
- Mechanical Installation & Maintenance
- Try and install all under floor coax distribution at stage V.
- Design improved mounting mechanism to minimise protrusions.
- Improve lateral movement capability for any miss-alignment of coax distribution during installation.

Revised Distribution Network



- Fixing the phase shift over a pair of cavities does not substantially affect the achievable acceleration
 - Providing the phase is not more than 20° from optimum for any particle
 - Suggest the coupled pairs be set at 124° , the lowest energy particles would then be 10° late and the highest 10° early
 - The third cavity in the chain should be set at 228° - 270° as the energy is reduced
- Mechanical Line Trimmers
 - Installed in 3 of the lines to each pair of resonators
 - Primarily to take up the assembly uncertainty
 - 82mm of travel, implies $\pm 10^\circ$ of trimming might be available
 - Dependant on how much has been take up in the trimming of the line
- Elimination of dynamic phase control between cavity pairs
 - Enabled simplification of distribution network

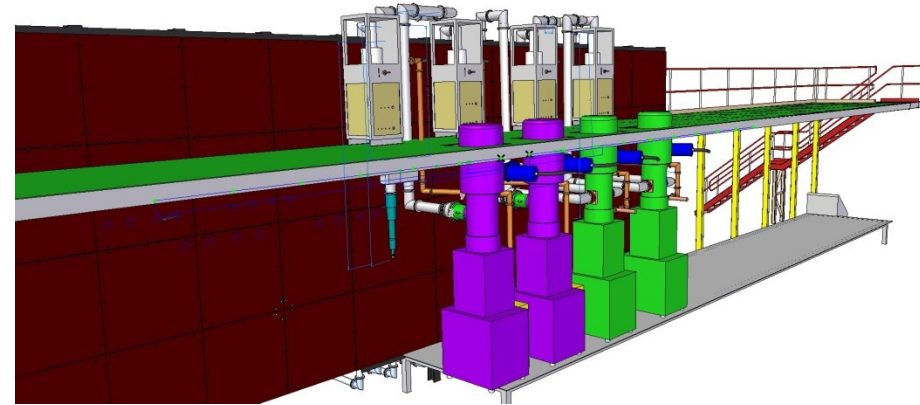
Schematic of Phase Control



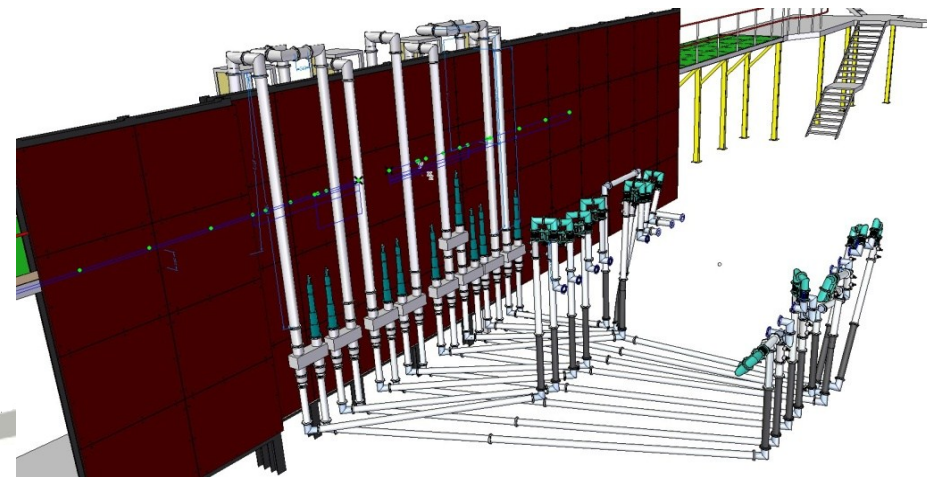
RF Layout – Final Installation

- Amplifiers installed behind shield wall
 - Triodes on main floor, Tetrodes on Mezzanine
 - Impact of B-fields currently being analysed
 - Shielding requirements assessed
- High power dynamic phase shifters removed.
- 4 off 6 inch coax lines over wall
 - Pressurised to increase power handling
- Hybrid splitters moved - more accessible
 - Minimises clutter and increases service access to the amplifier stations
- Line lengths matched using 3D CAD
- Manually adjustable line trimmers installed at cavity to take up assembly errors in coax length
- Easier to assemble – introduced flexible coax
 - Allows for small misalignments
- 2 Hybrids split output from the Berkeley Amplifiers on amplifier side of wall
- CERN amplifiers have two outputs
- 4 hybrids on MICE side of shield wall
 - Split power for the opposed couplers of each cavity
- Lines will be pressurised with 2Bar Nitrogen

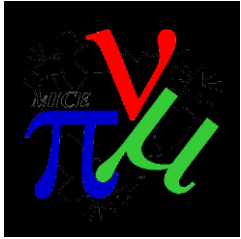
Amplifiers behind Shield Wall



Distribution Network to MICE

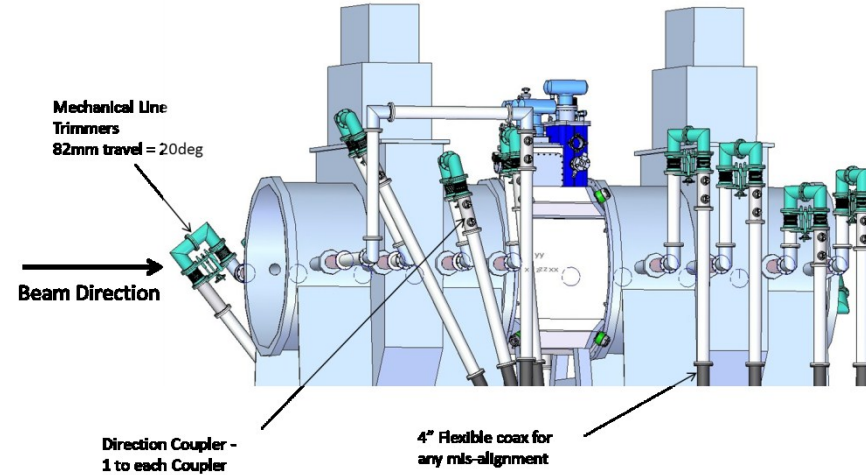
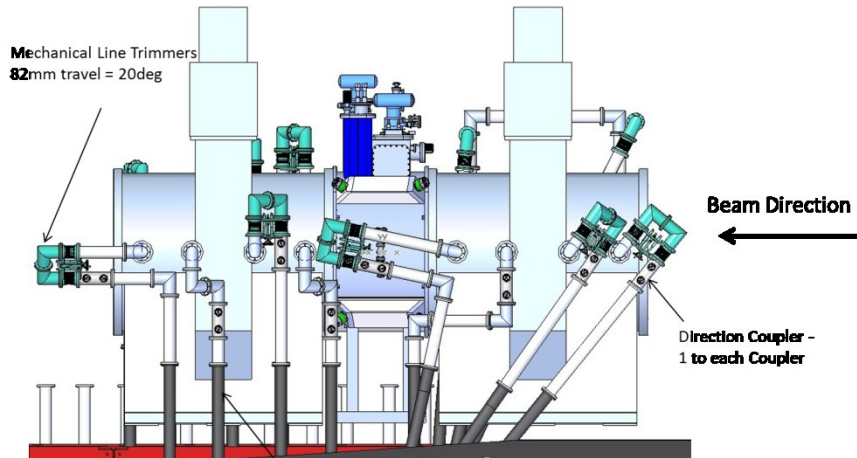


Revised Co-Axial Distribution Network

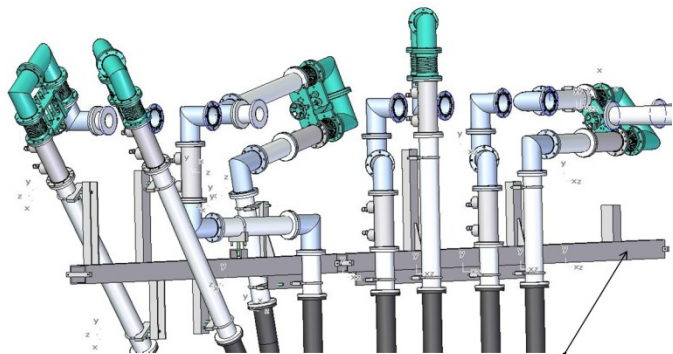


- Co-axial line length calculated: procurement in progress
- Most other components already being procured
- Hanger and Mounting designs completed and testing in hand

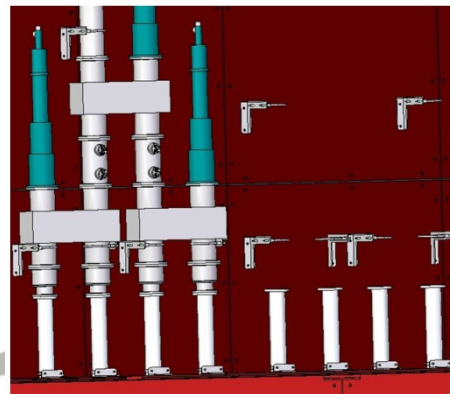
Line Trimmer Arrangement to South Side RF Couplers



**Common bracket & clamp design for coax and hybrid splitter support
On shield wall**

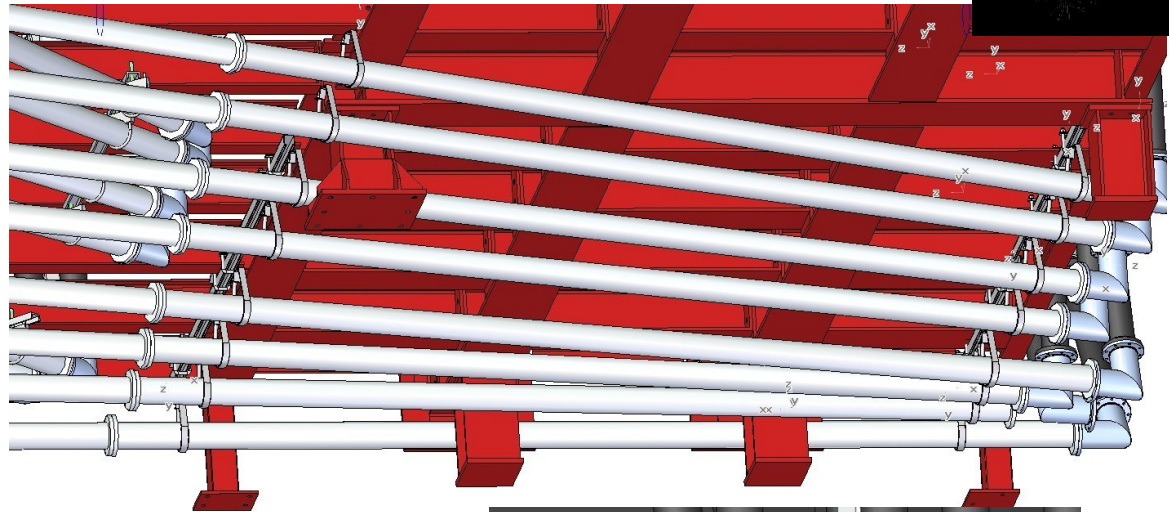
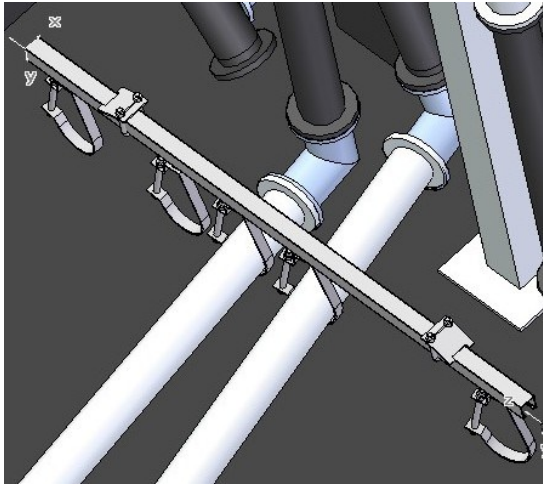
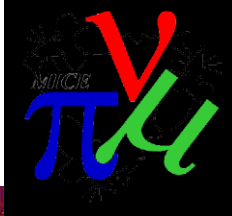


Support frame fixed to South Mezzanine support structure
Coax fixed (2 positions) to relieve stress on cavity couplers

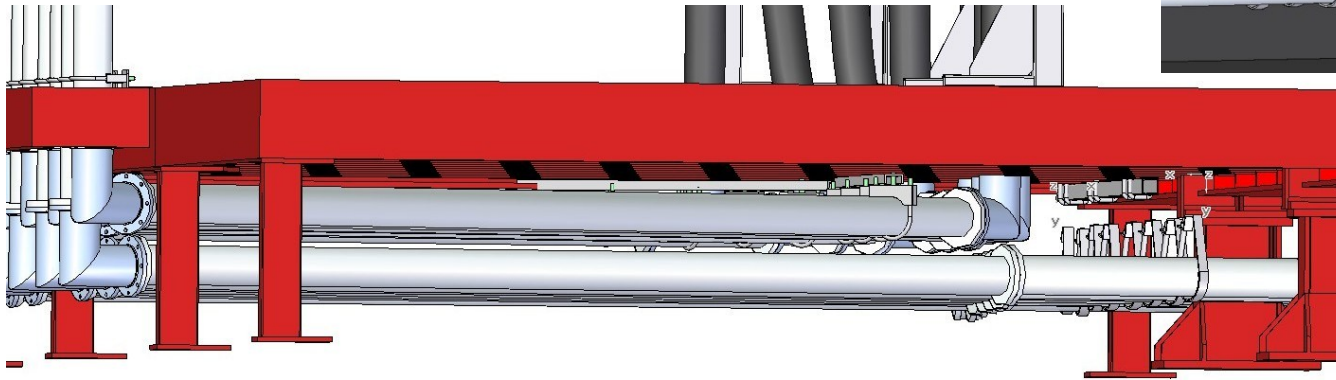
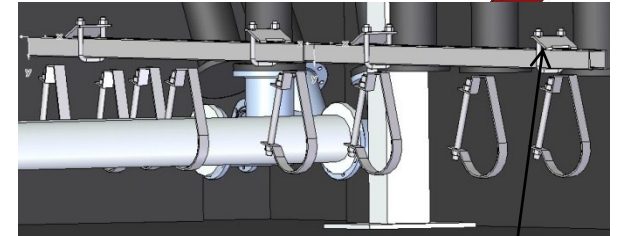


2 off Unistrut frames for coax support
RFCC's - North side

Designs of the RF Coax Support



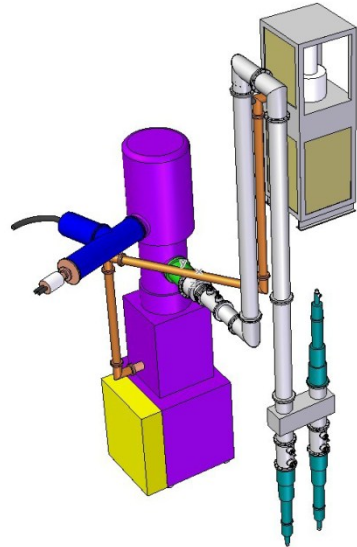
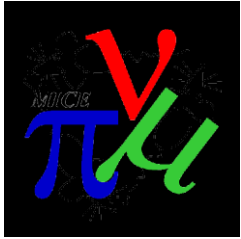
Coax held in position on 'hangers' suspended from floor steelwork. Flexible system



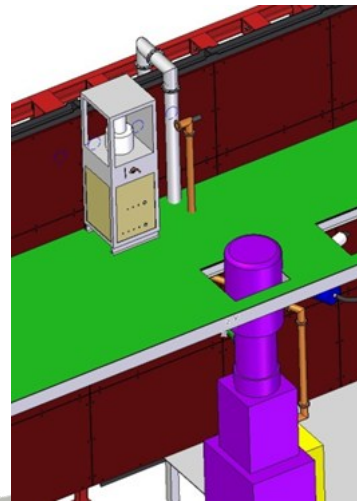
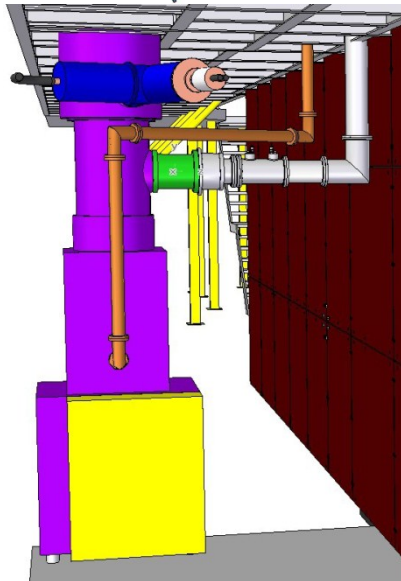
Hangers suspend on Unistrut fixed to steelwork with adjustable clamps.

No support structure on floor. Clear access for cable trays and water pipes.

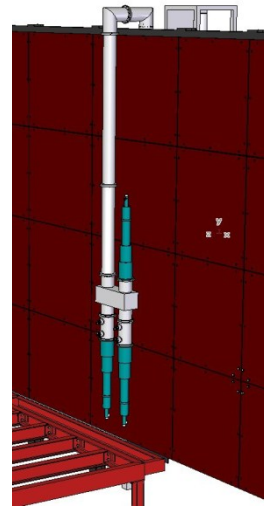
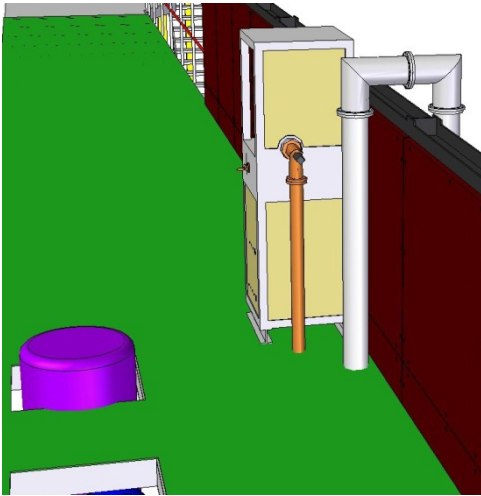
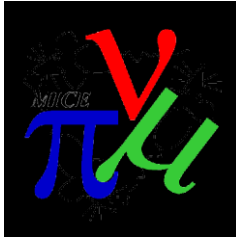
MICE Hall RF system for TIARA Test



- One amplifier set installed in operational position
 - Installed in the first amplifier station
 - Tetrode on Mezzanine, Triodes deep behind the shield wall
 - Opportunity to test the impact of B-fields during STEP IV
- One hybrid installed on MICE side of shield
- 3 loads, two will share the output power of the amplifier
- Procurement of all components under way



TIARA Installation Detail



Layout of Test system for TIARA test to 1 MW

- Amplifier test up to 1MW can be achieved by splitting power with hybrid into 2 loads
- Fourth port of hybrid must be terminated also
- 200KW loads can be used at upto 600KW in pulse mode with MICE pulse structure
- Use coax lengths from amplifier 2 for test, so no additional coax required

