

ABSTRACT**METHOD AND APPARATUS OF ELECTRICAL, MECHANICAL AND THERMAL
ISOLATION OF SUPERCONDUCTIVE MAGNETS**

A method and apparatus of electrical, mechanical and thermal isolation of superconductive magnet coils includes a superconductive magnet for environments wherein large differences of electrical potential between the interior superconductive winding and the exterior of the device, on the order of 10³ to 10⁶ Volts may exist. The methods and apparatus also includes insulation, cooling, and structural elements such that the interior of the device is capable of maintaining cryogenic temperatures needed for superconductivity, even in the presence of high heat flux incident on the overall winding housing. Finally, a device includes structural elements for support against gravity and other forces exerted on the assembly that include expansion jointing and stabilization to minimize warping or bending of the assembly due to temperature gradients. These supports include accoutrements for supplying electrical power, cryogenic coolant, and other supply leads to the magnet head, while also being isolated from thermal and electrical effects.

Figure 1.