

High field magnets

Superconducting magnets:

Nb-based superconductors have B_c up to ~ 25 T

Highest-field superconducting magnets to date: 23.4 T

Hybrid magnets:

Highest-field DC magnet: flux density 45 T in a 32 mm bore

Power consumption: 30 MW (>100 l/s cooling water required)

Resistive magnets:

Short pulse (10–20 ms) non-destructive magnets: 70–80 T range

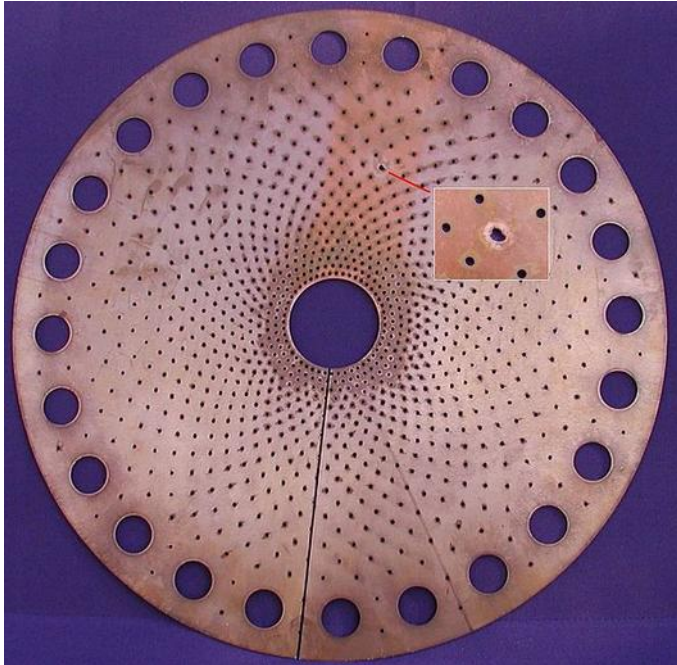
Destructive pulsed magnets up to ~ 2800 T during several microseconds

Hochfeldmagnet



Arrival of 45 T hybrid magnet cryostat at the National High Magnetic Field Laboratory, Florida State University, Tallahassee

Hochfeldmagnet

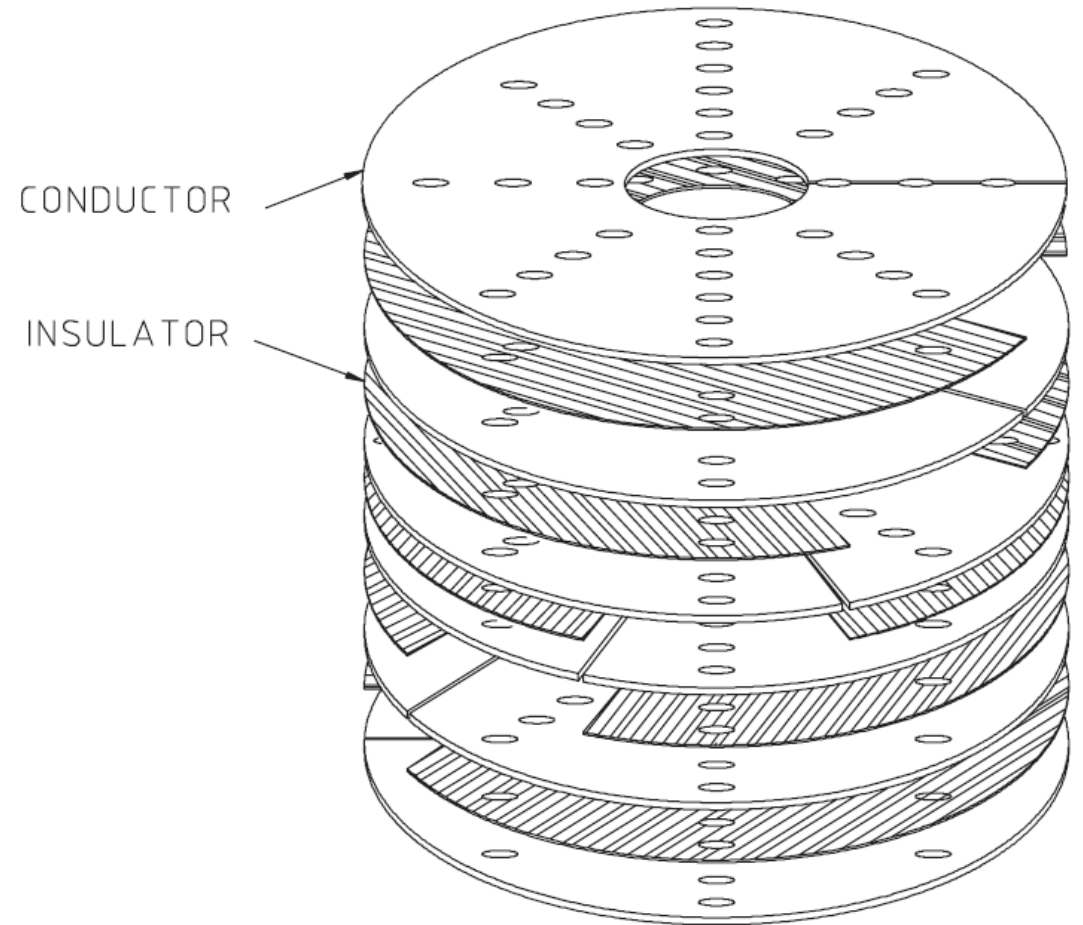


Bitter disk for a 16 T magnet

40 cm diameter

$I = 20 \text{ kA}$

$F \approx |B I|$



Schematic of a Bitter magnet showing alternate conductors and insulators (shaded). The adjacent conducting disks make contact in a region of overlap.