

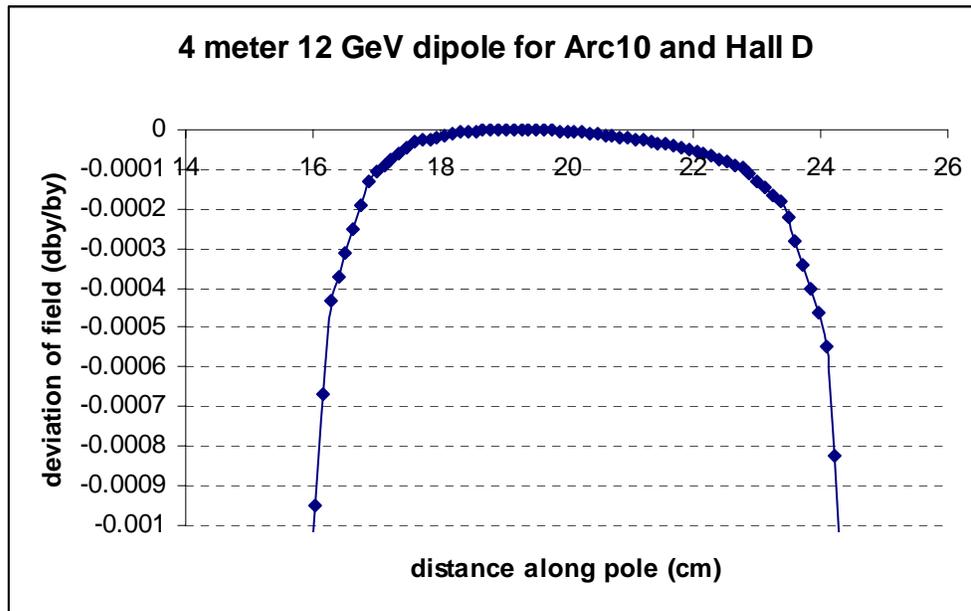
4 Meter Dipole Specification for the 12 GeV Upgrade

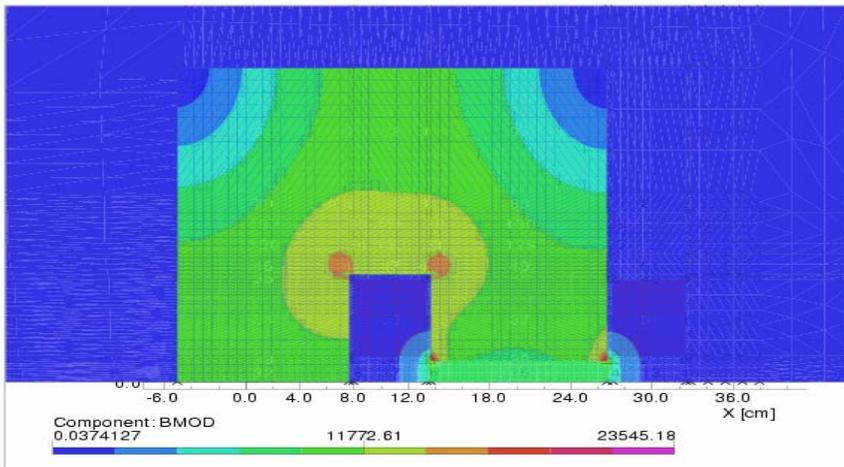
R. Wines

The upgrade of CEBAF to transport 5 pass 11 GeV beam to Halls A, B and C and the addition of 6th pass 12 GeV beam requires the addition of ARC 10 and transport to Hall D. The Arc 10 line will require 32 dipoles with 4 meter lengths. The magnetic field requirement is 9 kGauss. This magnet will also be used in the Hall D transport line.

Finite element analysis modeling has been done to find a solution to this magnet requirement. The solution utilizes the common arc c-style dipole cross section, BR, with a 5.125” pole. The wider pole arc magnet is required to meet the good field specification. With the addition of 2” of iron to the return leg and magnet height this design meets specifications. The coil design utilizes the existing BR coil design with 40 turns and operating current of 452 A.

At 452 A the magnet temperature rise is approximated at 37.1 C with LCW at 2.5 GPM.





UNITS
 Length : cm
 Flux density : gauss
 Field strength : oersted
 Potential : gauss-cm
 Conductivity : S cm⁻¹
 Source density : A cm⁻²
 Power : ergs⁻¹
 Force : dyne
 Energy : erg
 Mass : g

PROBLEM DATA
 brq+2-452A-aic10.st
 Quadratic elements
 XY symmetry
 Vector potential
 Magnetic fields
 Static solution
 Scale factor = 1.0
 9989 elements
 20160 nodes
 140 regions