

DEVELOPMENT OF SUPERCONDUCTING MAGNET SYSTEMS FOR HIF *

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A collaboration of LBNL, LLNL, MIT and Advanced Magnet Lab (AML) is developing superconducting focusing quadrupoles for near-term HIF experiments and future driver accelerators. Following the fabrication and testing of several prototypes, a baseline quadrupole design was selected and further optimized. The first model of the optimized design has achieved a conductor-limited gradient of 132 T/m in a 70 mm bore, with measured field harmonics within 10 parts in 10^4 . In parallel, a compact focusing doublet was fabricated and tested using two of the first-generation quadrupoles. After assembly in the cryostat, both magnets reached their conductor-limited quench current. Further optimization steps are currently underway to improve the performance of the magnet system and reduce its cost. They include the fabrication of a new prototype quadrupole with field quality at the 10^{-4} level, as well as improvements of the cryostat design for the focusing doublet. The prototype units could eventually be installed in the HCX beamline at LBNL, to perform accelerator physics experiments and gain operational experience.

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