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Comparison of Magnetic Field Maps by Direct Measurement and Reconstruction Using Boundary Element Methods

Boundary Element Methods (BEM) can be applied to determine the value of the magnetic field at any point within a domain if the magnetic field components are measured on the surface of the domain. For large magnetic volumes, BEM provides an attractive alternative to fine three-dimensional Hall probe scans as the fields can be evaluated inside the volume with an arbitrary position and with a reduced measurement time. BEM have been applied to the field data measured on the boundary of three-dimensional Hall probe scans for two example magnets, which have been measured at Daresbury Laboratory. The fields reconstructed using BEM are compared to the fields directly measured during the Hall probe scans. The reconstructed fields can be calculated to within 1 mT of the directly measured fields.

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