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Tue-Af-Po2.18-08 [39]: Analysis of Interdependent multipole field pattern and complement dipole field quality

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This paper presents an analytical method that finds the mutual influence of the magnetic field in a dipole magnet. A vacuum beam tube is in thermal contact with a cryogenic cooling pipe for a high-quality vacuum. These two different geometric components have different eddy current profiles. And the corresponding magnetic fields disturb the operation field quality. The cooling pipe in an optimal position shows the opposite polarity with the same magnitude of one multipole field component corresponding to that of the beam tube. The present geometric field analysis identifies the pattern of the multipole field and the cooling pipe position. The eddy current in the optimal conductor geometry is able to complement the dipole field quality.

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