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Electromagnetic Field Simulation in the KATRIN experiment
THOMAS CORONA, Massachusetts Institute of Technology, KATRIN COLLABORATION — The Karlsruhe Tritium Neutrino (KATRIN) experiment is a tritium beta decay experiment designed to make a direct, model independent measurement of the electron neutrino mass. To accomplish this task, the experiment employs precisely defined electric and magnetic fields for particle transport and mass spectroscopy. In order to simulate particle trajectories in the experiment, it is essential to have methods for calculating these fields quickly and accurately. The application of the methods of direct elliptic integral calculation, zonal harmonic expansion and interpolation from an adaptive-refinement field mesh is described, as well as an analysis of their comparative strengths and weaknesses in reproducing the electromagnetic fields found in KATRIN.

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