

Simulation Studies for a Hyperon Time Projection Chamber (HypTPC) at J-PARC

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The J-PARC E42 experiment aims at searching for the H-dibaryon composed of six quarks (uuddss)[1]. A time projection chamber, called HypTPC, is a central tracking device of the E42 spectrometer, which reconstructs decay products from the H-dibaryon such as $\Lambda\Lambda$ or $\Lambda p\pi^-$. The experiment is carried out using (K^-, K^+) reactions with a diamond target. This target will be located inside the HypTPC drift volume, so that special care should be paid for the reduction of a possible electric-field distortion around the target structure. We develop a full simulation software to study the HypTPC performance, based on three-dimensional electric and magnetic field calculation results from Maxwell3D, drifting characteristics in gas using Garfield⁺⁺, and particle interactions using Geant4. In this talk, the simulation results for the HypTPC will be reported with special emphasis on an $\vec{E} \times \vec{B}$ effect near the target structure.

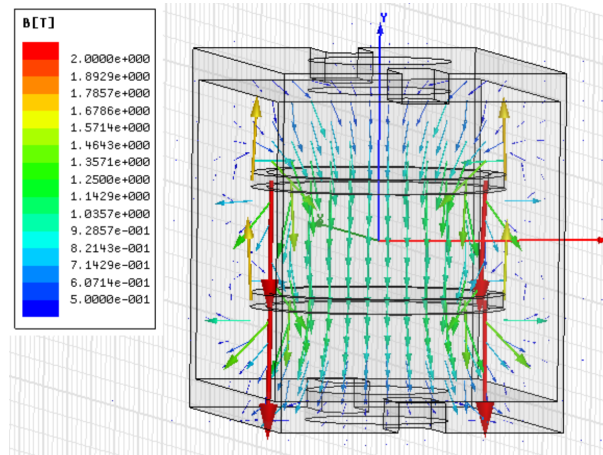


Figure 1: B field calculation of Helmholtz Coil using Maxwell3D.

- [1] J.K. Ahn and K. Imai, J-PARC Proposal E42, Search for the H-dibaryon with a Large Acceptance Hyperon Spectrometer ; J. K. Ahn, Few-Body Sys. 54, pp 387-390 (2013).