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Automatic measurement of the stray magnetic field in the RCS locations of RHIC by using the SPOT robot

Tuesday 3 June 2025 16:00 (2 hours)

The Electron Ion Collider (EIC) will collide high energy and highly polarized hadron and electron beams with luminosities up to 10^34/cm^2/s. In the Conceptual Design Report baseline scope, the electron beams, accelerated in the Rapid Cycling Synchrotron (RCS), are vulnerable to the outside magnetic field due to its low injection energy at 400 MeV. In addition, when the Hadron Storage Ring (HSR) and Electron Storage Ring(ESR) are in operation, the leaking field from the HSR might also affect the operation of RCS, because they are close to each other. Mapping the stray magnetic field throughout the Relativistic Heavy Ion Collider (RHIC) tunnel is essential to assess its impact on potential low-energy electron beam injection. A robot dog (SPOT) is used to automate the measurement of this stray magnetic field during the RHIC (or future EIC) operation at any location continuously. This quadrupedal robotic technology can also be applied to other future applications, including radiation, temperature, pressure, and other properties measurement during EIC operation.

Footnotes

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