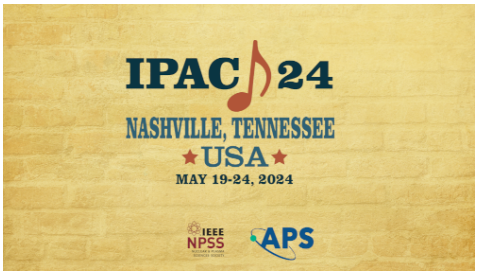

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Wide range tune scan for the hadron storage ring of the Electron-Ion Collider

Monday, 20 May 2024 16:00 (2 hours)

The Electron Ion Collider (EIC), to be constructed at Brookhaven National Laboratory, will collide polarized high-energy electron beams with hadron beams, achieving luminosities up to 1e+34 cmˆ−2 sˆ−1 in the center-mass energy range of 20-140 GeV. The current fractional design tunes for the Hadron Storage Ring (HSR) are (0.228, 0.210) to mitigate the effects of synchro-betatron resonances. In this article, based on a strong-strong beam-beam simulation model, we carried out a wide range tune scan for the HSR to search for optimum working points. We found a good tune space around (0.735, 0.710), which is close to the working point (0.695, 0.685) of the polarized proton operation of the Relativistic Heavy Ion Collider (RHIC). We plan to further estimate the dynamic aperture and polarization with this working point.

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