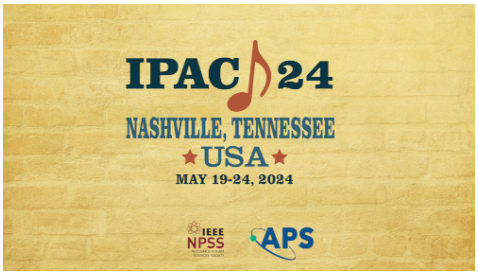

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Various methods for computing dominant spin-orbit resonance strengths in storage rings

Tuesday, 21 May 2024 16:00 (2 hours)

The strength of a first-order spin-orbit resonance is defined as the amplitude of the corresponding Fourier component of the spin-precession vector. However, it is possible to obtain the resonance strength without computing the Fourier integral directly. If a resonance is sufficiently strong, then to a good approximation, one can neglect all other depolarizing effects when near the resonance. Such an approximation leads to the single resonance model (SRM), for which many aspects of spin motion are analytically solvable. In this paper, we calculate the strength of first-order resonances using various formulae derived from the SRM, utilizing spin tracking data, the direction of the invariant spin field, and jumps in the amplitude-dependent spin tune. Examples are drawn from the RHIC Blue ring.

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Primary author: DEVLIN, Joseph (Cornell University (CLASSE))

Co-author: HOFFSTAETTER, Georg (Cornell University (CLASSE))

Presenter: DEVLIN, Joseph (Cornell University (CLASSE))

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