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An extended Froissart-Stora formula for changing crossing speed

Tuesday 12 August 2025 16:00 (2 hours)

When the closed-orbit spin tune is ramped linearly through an isolated spin-orbit resonance, the asymptotic polarization loss is well-approximated by the Froissart-Stora formula. However, it is often observed in accelerator simulations that the crossing speed, defined as the slope of the amplitude-dependent spin tune with respect to the machine azimuth, changes at the moment of resonance crossing. For example, the behavior of the amplitude-dependent spin tune in the vicinity of a higher-order spin-orbit resonance can often be reasonably approximated by such a piecewise-linear function. In this paper, we derive an extension to the Froissart-Stora formula which describes the asymptotic polarization loss in the case of changing crossing speed. We then demonstrate that this formula provides a good estimate of the polarization lost when crossing a higher-order spin-orbit resonance in both a toy model and simulations of RHIC.

Please consider my poster for contributed oral presentation

Yes

Would you like to submit this poster in student poster session on Sunday (August 10th)

No

Footnotes

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

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