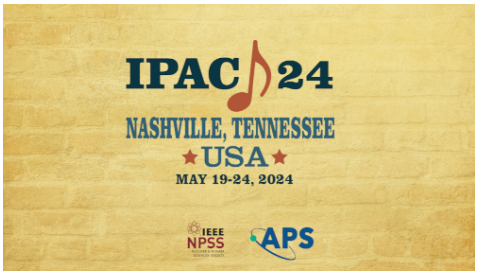

Contribution ID: **1028** Contribution code: **MOPS02** Type: **Poster Presentation**

Machine learning polarization transfer through the double resonance model with two Siberian Snakes

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

The isolated resonances model of spin depolarization hinges on a closed-form solution of energy ramping through the Single Resonance Model by Froissart and Stora. However, depolarization by single-resonance crossing is impossible in the SRM with pairs of Siberian Snakes for appropriately chosen orbital tunes, since the amplitude-dependent spin tune is fixed to one-half. This demonstrates that the isolated resonances model is not a good approximation of polarization dynamics with Siberian Snakes. We therefore develop an extended model in which pairs of resonances in close proximity push the amplitude-dependent spin tune away from one-half in the presence of Siberian Snakes, allowing the crossing of higher-order spin resonances associated with depolarization. Here we present results from applying Machine Learning methods that establish spin transport models with two overlapping resonances from tracking data. These can then be used to predict spin tune deviations from ½ over a large parameter space, allowing us to find conditions for the presence or avoidance of higher-order resonances, and to compute the effective strengths of such higher-order resonances.

Footnotes

Funding Agency

Work supported by Brookhaven Science Associates, LLC under Contract No. DE-SC0012704 with the U.S. Department of Energy, No. DE SC-0024287, and DE-SC0018008.

Paper preparation format

LaTeX

Region represented

North America

Primary author: HAMWI, Eiad (Cornell University (CLASSE))

Co-authors: HOFFSTAETTER, Georg (Cornell University (CLASSE)); DEVLIN, Joseph (Cornell University (CLASSE))

Presenter: HAMWI, Eiad (Cornell University (CLASSE))

Session Classification: Monday Poster Session

Track Classification: MC5: Beam Dynamics and EM Fields: MC5.D13 Machine Learning