### IPAC'24 - 15th International Particle Accelerator Conference



Contribution ID: 1026 Contribution code: MOPS04

Type: Poster Presentation

# Proton polarization in RHIC with partial Siberian snakes

Monday 20 May 2024 16:00 (2 hours)

In December 2021, damage to a couple of RHIC power supplies forced one of two Siberian Snakes in the Blue ring to operate as a partial Siberian Snake and with a different snake axis of rotation. The time-averaged polarization for that run actually ended up higher than in the Yellow ring, after casting the undamaged snake as a partial snake as well. In this work, we simulate polarization transmission through a series of increasingly realistic models of the Blue ring in the "dangerous region" of polarization loss. At first the bare lattice has a perfect closed-orbit and ideal magnet strengths. Then the measured magnet-to-magnet field strength variations were added to the lattice. Finally, the six Interaction Region 5mm closed orbit bumps were implemented. Each of these model lattices compared the use of a pair of partial snakes against a pair of a full snakes, and in simulations with realistic emittances, realistic polarization losses were not reproducible without inclusion of nonzero RMS lattice misalignments.

## Footnotes

### **Funding Agency**

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

#### Paper preparation format

LaTeX

#### **Region represented**

North America

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Session Classification: Monday Poster Session

**Track Classification:** MC5: Beam Dynamics and EM Fields: MC5.D02 Nonlinear Single Particle Dynamics Resonances, Tracking, Higher Order, Dynamic Aperture, Code Developments