



Contribution ID: 35

Type: **Poster**

Spin tune mapping at COSY

Thursday, June 14, 2018 3:48 PM (2 minutes)

In precision searches for electric dipole moments of charged particles using storage rings, one needs to quantify background signals that stem from false rotations of the magnetic dipole moments in the horizontal magnetic fields of the storage ring. Mapping the spin tune response of a machine with artificially applied longitudinal magnetic fields allows one to probe the magnetic imperfection field content of the ring. The novel technique, called spin tune mapping, emerges as an extremely powerful probe of the spin dynamics in storage rings. The technique was experimentally tested by JEDI at COSY, and for the first time, the angular orientation of the stable spin axis has been determined to an unprecedented accuracy of $2.8 \mu\text{rad}$.

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Session Classification: poster