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Final preparation of accelerated and polarised protons at COSY Jülich

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2023 was the last year of operation for the Cooler Synchrotron (COSY) in Jülich, Germany. To prepare for the extraction of polarized protons at a momentum of 1950 MeV/c to an external target, full advantage of the most recent developments of the COSY control system was taken along with the established hardware of COSY. Challenges in beam development included the operation close to transition energy as well as seven depolarizing resonances (4 intrinsic and 3 imperfection resonances) which have to be crossed during the acceleration. To overcome the intrinsic resonances tune jumps were carried out with the Q-jump quadrupole system of COSY. *To identify the correct time window for the jump, the precise measurement of the tune** during the acceleration ramp was used.

We present how the recent developments in the control system, along with the established techniques, enabled us to successfully accelerate and extract the polarized beam.

Footnotes

- A. Lehrach et al., "Acceleration of the Polarized Proton Beam in the Cooler Synchrotron COSY", Proc. PAC 1999 ** P.J. Niedermayer et al., "Development of a Fast Betatron Tune and Chromaticity Measurement System for COSY", Proc. IPAC'21

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