

# A New Simulation Framework for Optimizing Beam Dynamics and Analyzing Data in High Current Cyclotrons

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This paper presents the development of a simulation framework designed for beam dynamics simulations and data analysis in high current cyclotrons. Cyclotrons, used in applications such as particle physics and medical isotope production, require precise and efficient simulation tools to optimize beam performance and ensure operational accuracy. The proposed framework integrates advanced computational algorithms with a user-friendly interface to facilitate detailed modeling of beam trajectories, magnetic field interactions, and particle dynamics within high current cyclotron systems. It utilizes high-performance computing techniques to handle complex simulations and large datasets, providing robust tools for real-time analysis and visualization. Key features of the framework include customizable simulation parameters, automated data processing pipelines, and advanced statistical analysis capabilities. This development aims to enhance the accuracy of cyclotron beam dynamics predictions and streamline data analysis workflows, ultimately contributing to improved cyclotron design and operational efficiency.

## Paper submission Plan

No

## Best Presentation

No

## Contribution track

ICABU WG2. Beam Physics, Diagnostics & Novel Techniques

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