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Application and comparative analysis of the APES_CBI module in BEPC-II experimental results

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This paper primarily explores the application and comparative analysis of the Accelerator Physics Emulation System Cavity-Beam Interaction (APES_CBI) module in the BEPC-II (Beijing Electron-Positron Collider) experiments. The APES_CBI module is an advanced time-domain solver, designed for analyzing RLC circuits driven by beam and generator currents and simulating the dynamic responses and synchrotron oscillations of charged particles within the cavity.

The paper details the module's application in BEPC-II experiments, particularly in simulating beam dynamics under strong beam-loading conditions and interactions with the accelerator's impedance. It focuses on analyzing the module's performance, accuracy, and efficiency in simulating synchrotron oscillations and beam-beam interactions under complex beam conditions.

By comparing the simulation results of the APES_CBI module with the experimental data from BEPC-II, this paper demonstrates the module's capability in accurately simulating complex physical phenomena within accelerators. This comparison not only validates the effectiveness of the CBI module but also offers valuable insights for future accelerator design and research.

Footnotes

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Asia

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