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Experimental study on the fast bunch merging in high-intensity hadron synchrotrons

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For high-intensity hadron synchrotrons, the longitudinal manipulation (rf gymnastic) is of practical importance to customize the parameters and status of the hadron beams to fulfill various scientific and industrial goals. For the recently-built China Spallation Neutron Source (CSNS), a high-intensity single-bunch operation mode based on longitudinal bunch merging has been proposed to enhance the neutron resolution for a few experiments of nuclear data measurement. We present experiment study and recent progress on the fast and high-intensity bunch merging carried out in the CSNS RCS. The feasibility of the fast and high-intensity bunch merging scheme in the RCS is demonstrated. In the fast bunch merging with low intensity, basic parameters for bunch merging, such as merging time are systematically optimized. In the fast bunch merging with high intensity, to compensate the high-intensity effects, including space charge and beam loading is developed.

Footnotes

Funding Agency

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Yes

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