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A scheme to extract the beam in advance and transverse beam distribution measurement for the CSNS RCS

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The China Spallation Neutron Source (CSNS) is a large scientific facility for frontier research by using the medium energy protons bombardment of tungsten target to produce a large number of scattered neutrons. The rapid cycling synchrotron (RCS) adopts the single-turn fast extraction scheme to extract the proton beam with the energy of 1.6GeV, and the extraction repetition frequency is 25Hz. In order to optimize the painting distribution and reduce the beam loss in the beam commissioning, it is necessary to measure the transverse beam distribution during the injection and acceleration processes. In this paper, a scheme to extract the beam in advance is proposed which is performed by adjusting the extraction timing and extraction mode. By using this extraction mode, the beam can be extracted at different time and the transverse beam distribution can be measured by a multi-wire scanner located on the beam transport line from the RCS to the target (RTBT). Then, the beam distribution at the desired position on the RCS can be deduced by using the beam transfer matrix.

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Footnotes

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Yes

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