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Controlling induced radioactivity in CSNS RCS

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Controlling induced radioactivity remains crucial for high-intensity proton accelerators. This study analyzes radiation hotspots in a Rapid Cycling Synchrotron (RCS) using extensive dose measurements (2018-2025). We identified hotspots (>5 mSv/h) exhibiting either transient ("peaking-then-decreasing") or persistent ("increasing-then-stabilizing") behavior. Strategic measures - orbit correction, parameter optimization, and hardware improvements - effectively reduced radiation, exemplified by Kicker01's dose rate dropping from 20 mSv/h. However, persistent hotspots like R1SD03 (˜10 mSv/h) require further study of local beam loss mechanisms. These findings advance radiation control strategies for safer, more efficient proton accelerators.

Footnotes

Funding Agency

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Author: AN, Yuwen (Institute of High Energy Physics)

Co-authors: LIU, Hanyang (Institute of High Energy Physics); CHEN, Jianliang (Chinese Academy of Sciences); Ms LIU, Meifei (Spallation Neutron Source Science Center); HUANG, Ming-Yang (Institute of High Energy Physics); XU, Shouyan (Dongguan Neutron Science Center); LI, Yong (Dongguan Neutron Science Center); YUAN, Yue (Institute of High Energy Physics); LI, Zhiping (Dongguan Neutron Science Center)

Presenter: AN, Yuwen (Institute of High Energy Physics)

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