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New painting injection scheme for the CSNS-II

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As the second phase of the CSNS, CSNS-II will achieve a beam power on the target of 500 kW. The injection energy of CSNS-II will be increased from 80 MeV to 300 MeV and the injection beam power will be increased about 20 times. Therefore, the injection system needs to be comprehensively upgraded and the injection scheme needs to be redesigned. Based on the experience of the CSNS and simulation results, it is hoped that the new injection scheme can not only be compatible with correlated and anti-correlated painting, but also must further reduce the temperature rise of the stripping foil. After in-depth analysis and simulation, a new painting injection scheme for the CSNS-II has been proposed. The chicane bump and horizontal painting bump are combined into one bump which makes the chicane bump “move”, and the horizontal painting is performed by using the position and angle scanning at the same time. The new scheme not only realizes the compatibility of correlated and anti-correlated painting, but also greatly reduces the temperature rise of the stripping foil. After a comprehensive simulation study of the painting process, the new painting scheme has been verified to be feasible and has obvious advantages compared with the traditional bump painting scheme.

Speaker's Name

Ming-Yang Huang

Speaker's Title

Dr.

Speaker's Gender

Man

Speaker's Pronouns

He/Him

Speaker's Preferred name (if any)

Primary author(s) : Dr HUANG, Ming-Yang (Institute of High Energy Physics, Chinese Academy of Sciences, Beijing 100049, China); WANG, Sheng (Institute of High Energy Physics, Chinese Academy of Sciences)

Presenter(s) : Dr HUANG, Ming-Yang (Institute of High Energy Physics, Chinese Academy of Sciences, Beijing 100049, China)

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