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Ion effects studies for Diamond-II with a simplified model

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Ion instabilities are a major concern in diffraction-limited storage rings. ELEGANT offers a 'strong-strong' model for ion simulations that describes both the beam and ions using multi-particles. To balance accuracy and computing resources, a simplified model using ILMATRIX and one IONEFFECTS element per turn is employed to study the ion effects of the Diamond-II storage ring. After benchmarking, it was found that the simplified model overestimates the ion instability compared with element-by-element tracking by a small amount. A preliminary vacuum conditioning process has been studied, and ion instabilities have been analysed at different stages for various filling patterns. This paper outlines the simulation settings and presents preliminary results, including the filling patterns to be used at each stage of vacuum conditioning. The ion instability for hybrid filling patterns at the expected operational vacuum condition is also studied.

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Footnotes

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Yes

Primary author: WANG, Siwei (Diamond Light Source Ltd)

Co-authors: COX, Matthew (Diamond Light Source Ltd); FIELDER, Richard (Diamond Light Source Ltd); MARTIN, Ian (Diamond Light Source Ltd)

Presenter: WANG, Siwei (Diamond Light Source Ltd)

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