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Cross-talk effect of adjacent impedance elements studied for the HALF storage ring

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In the storage ring of a fourth-generation synchrotron light source such as the Hefei Advanced Light Facility (HALF), a multitude of vacuum elements interact with the beam current, thereby generating beam coupling impedance. This is a crucial factor contributing to beam instabilities and affecting the machine performance. Conducting impedance analysis on a vacuum element-by-element basis, without accounting for the cross-talk effect between adjacent elements, may result in an imprecise impedance model. This could subsequently have a detrimental impact on the accuracy of beam dynamics analysis. In this paper, we will utilize CST electromagnetic simulation software to model adjacent impedance elements in the HALF storage ring, with a view to conducting a comprehensive investigation into the cross-talk effect.

Footnotes

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