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Comparison of simulation and measurement of an in-vacuum undulator coupling impedance at NSLS-II

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The impedance of in-vacuum undulators (IVU) is a significant part of the total broadband impedance determining collective effects of beam dynamics in synchrotrons. It is computationally difficult to simulate the full few-meter-long 3D structure, which includes bellows, flanges, and taper transitions with a variable gap. So, the impedance is usually calculated separately for a simplified geometry of every component and the resistive-wall impedance is calculated using analytical formulas. The ECHO3D code based on a low-dispersive numerical technique provides an opportunity to compute the wakefield induced by a very short bunch in the full 3D model of the NSLS-II IVU. Here, we discuss the numerical simulations in comparison with beam-based measurements.

Footnotes

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