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Estimation of the Wakefield Resonant Frequency Using Different Simulation Tools

Tuesday 12 August 2025 16:00 (2 hours)

Reliable and fast wakefield calculations are important for beam dynamics and THz generation in accelerators. We compare approaches and limitations with different available simulation tools and compare results. As an example, we analyze a cylindrical corrugated waveguide with narrower and wider radii of 5 and 6 mm, and aperture width and periodicity of 1 and 2 mm using ABCI by KEK and ANSYS HFSS simulation software. First, ABCI was used to determine the resonant frequency of the cylindrical corrugated waveguide with different lengths. The corresponding results were taken as a reference to examine the simulation method in the ANSYS HFSS environment. The eigenmode solver of ANSYS HFSS was used to determine different resonant frequencies. This was followed by examining a cylindrical corrugated waveguide that was implemented having a length of 17 mm for different conductor settings. The corresponding waveguide was fed by a plane wave having a resonant frequency that satisfies the intersection of the light line and dispersion curve of the corresponding mode. The analysis showed that the maximum loss factor was achieved at 39.20 and 40.07 GHz using ANSYS HFSS simulation data for different conductors, whereas ABCI resulted in 38.50 GHz. The talk will present the results gathered by different simulation setups implemented in ANSYS HFSS.

Please consider my poster for contributed oral presentation

Yes

Would you like to submit this poster in student poster session on Sunday (August 10th)

No

Footnotes

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

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