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Cherenkov diffraction radiation dielectric button characterization via a slab-line

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The generation of Cherenkov diffraction radiation when a charged particle beam passes in close proximity to a dielectric target is being studied and developed for various non-invasive beam instrumentation applications. One such instrument is a beam position monitor (BPM) composed of four cylindrical dielectric inserts. A challenge of using the conventional stretched wire technique to characterize the BPM is the coupling of higher order modes (HOMs) into the inserts that are dielectric-loaded circular waveguides. To minimize the generation of HOMs and excite mainly the transverse electromagnetic (TEM) mode as a model of the beam field, a set-up comprising a dielectric insert mounted on a slab line with 50 Ohms characteristic impedance was tested. The results and comparison with numerical simulations in CST are presented.

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Footnotes

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Yes

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