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A bead-pulling test stand for s-band cavities

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Additive manufacturing is a promising approach to reduce production costs for high-frequency cavities while increasing design freedom. This potential will be evaluated through studies on several cavity prototypes and their performance. Especially for the evaluation of the field distribution in cm-sized S-band cavities and thus the shunt impedance, the development of a measurement setup for qualitative and fast measurements is useful. Therefore, we present a perturbation measurement (bead-pulling) test stand that allows a standardized and efficient measurement of the field distribution in cavities. It consists of a motorized linear translation stage, a microcontroller, and a vector network analyzer, all controlled via LabVIEW. The perturbation constant α (Al_2O_3) was determined using a drift tube cavity previously characterized with a 16 MeV tandem Van de Graaff proton beam. In addition, the measurement accuracy with different step sizes and speeds of the linear translations stage was tested on this cavity. Subsequently, the first measurements on an additively manufactured 5-cell drift tube cavity were performed to determine its shunt impedance.

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Footnotes

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Yes

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