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Integral Field Probe for Mapping of Curved Magnets

Wednesday 13 August 2025 16:00 (2 hours)

The Single Stretched Wire (SSW) method allows highly precise integral field measurements by recording voltage across a tensioned wire mounted to 2-axis linear stages at either end of the magnet aperture. However, traditional SSW probes are not well suited for curved accelerator magnets, which are essential for steering charged particles along arced trajectories in storage rings or beamlines. The tension required to eliminate sag demands a purely straight path, making them incompatible with non-linear magnet geometries. To address this limitation for curved magnets, a modified approach was developed using a segmented, 3D-printed support structure that incorporates a pre-shaped "anti-sag"curve. Under its own weight and that of the wire bundle, the structure deforms to lie flat while conforming to the curvature of the magnet in the horizontal plane. The optimal geometry of the probe was derived using an iterative process combining FEA simulations in Ansys Mechanical with testing of various carbon fiber-reinforced filaments. The printed and assembled probe was successfully used to measure the SDD-055 magnet at Fermilab, yielding promising results.

Please consider my poster for contributed oral presentation

No

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

Yes

Footnotes

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

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