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Beam position monitors for HEPS

Tuesday, 10 September 2024 16:00 (1h 30m)

At the High Energy Photon Source (HEPS), a high orbital stability of typically 10 % of the beam size and angular divergence must be achieved, which implies that the beam orbit must be stabilized to the sub-micrometer level. A button and stripline beam position monitor (BPM) were designed based on the analytical formulas and CST simulations results. The results of electromagnetic field simulations revealed how various mechanical errors, such as button size and location accuracy, as well as the related button capacitance, exert different influences on the beam position measurement. The performance of an actual BPM pickup was measured, along with an assessment of the error on the beam position measurement. Additionally, a wakefield analysis, including an investigation of trapped resonant modes and related thermal deformation, was conducted. The characteristic impedances of the stripline were designed to be 50 Ω and confirmed by measurements. The position sensitivity, position resolution, capacitance and the electro-mechanical offsets were measured using the Lambertson method, and the calibration coefficients were measured using a stretched wire.Various problems that arise during the processing and installation process will also be introduced.

Footnotes

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

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