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Design of SLS 2.0 BPM block support structure with damping mechanism

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The positional stability of SLS 2.0 beam position monitors is crucial for effective fast orbit feedback and beam stability. Long-term stability is ensured by minimizing thermal drift through precise control of ambient air and cooling water temperatures. Mechanical stability is achieved using a specially designed sandwich support structure that incorporates damping material to suppress vibrations. The BPM support comprises double steel plates bonded with a stiff end-grain balsa wood core using a viscoelastic adhesive, effectively enhancing both stiffness and damping. To further reduce beam-induced temperature fluctuations, the upper section of the support includes a water-cooled copper block. To select the adhesive type and optimize the bonding layer thickness, dedicated vibration tests were performed. For final qualification, the specimen underwent aging tests in a climate chamber. This work presents tests for selection and qualification of the damping material, along with a numerical study of thermal dilatation of the arc section during synchrotron radiation power heat up. The temperature measured at 400 mA beam current will be presented and compared with simulation results.

Footnotes

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