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Capacitive BPM electromagnetic design optimisation

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Capacitive beam position monitors (BPM) are widely used as diagnostics tools in particle accelerators. Typically due to a large number of BPM in an accelerator, their contribution to the beam coupling impedance cannot be neglected. In addition to the broadband part at low frequencies, the impedance exhibits resonant peaks at higher frequencies due to electromagnetic fields trapped around the BPM button and in the feedthrough assembly. Coupling of these peaks with beam spectrum lines can result in the BPM overheating. In this paper, we discuss the BPM design optimization aimed at the beam coupling impedance minimization while keeping/improving the BPM signal sensitivity (transfer impedance).

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Footnotes

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