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Button-Type Beam Position Monitors for Elettra 2.0: from design to real measurements.

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This paper describes the main stages of the journey from preliminary ideas on button shapes to actual measurements on prototypes of Beam Position Monitor (BPM) devices for Elettra 2.0.
In the first stage, the electromagnetic phenomena involved in BPM sensors were studied taking into account different pick-up geometries, dielectric and conductive materials, and bunch lengths. Critical aspects such as beam coupling impedance, transfer impedance, impedance matching, trapped/propagating mode effects and heating were evaluated through numerical simulations.
In the second stage, three families of vacuum-tight pick-up samples were fabricated in-house, and their actual performance was evaluated both on a microwave test bench and in real operating conditions on the Elettra storage ring. To carry out future measurements on alternative BPM designs, the third family was specifically conceived and built to allow quick and easy pick-up replacement using ultra-high vacuum shape memory alloy sealing technology.
The third stage focused on comparing the signals produced by the Elettra BPMs with those foreseen for Elettra 2.0, and also allowed validation of the in-house developed BPM electronics.

Footnotes

Funding Agency

I have read and accept the Conference Policies

Yes

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