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Design and Expected Performance of the new BPM systems for AWAKE Run 2C

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The AWAKE facility at CERN uses novel proton beam-driven plasma wakefields to accelerate electron bunches over a 10 m plasma source. The facility will soon be rebuilt to study methods to improve the quality of the accelerated electron beam, requiring better resolution from the proton BPMs. In addition, it is desirable to replace the existing bespoke electron BPMs with an in-house solution. Both upgrades will reuse the existing BPM pickups (electrostatic buttons and striplines, respectively) but replace the electronic front-ends and control system interfaces. An RFSOC-based BPM front-end is concurrently being developed for the HL-LHC upgrade, which, if appropriate for AWAKE, would reduce production and maintenance efforts. For the proton BPMs, distributed along an 800 m transfer line, time-multiplexing of both pickups per plane has been chosen both to reduce cabling and channel count and improve systematic errors in the measurements. We present the expected performance of both the AWAKE proton and electron BPMs using the prototype HL-LHC BPM front-end, based on measurements from the existing facility.

Footnotes

Funding Agency

I have read and accept the Conference Policies

Yes

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