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## ChDR bunch length monitor improvements at CERN

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The goal of the Advanced Wakefield Experiment (AWAKE) is to accelerate externally injected electrons using a plasma wakefield driven by a 400 GeV proton bunch. To achieve this, the electron bunches must have a short bunch length of 200 fs, making the implementation of a real-time, non-invasive bunch length monitor essential. This monitor uses alumina dielectric prisms inserted into the vacuum chamber to generate Cherenkov Diffraction Radiation (ChDR) as the beam passes nearby. The ChDR is detected using Schottky diodes sensitive to frequencies in the coherent regime. In this paper, we will present theoretical bunch length calculations based on the polarization current approach (PCA) to determine the appropriate frequency ranges for the Schottky diodes, along with CST simulation studies of the monitor's design in preparation for upcoming experiments.

### Footnotes

### Funding Agency

STFC-funded studentship

### I have read and accept the Conference Policies

Yes

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