

# 13th Beam Telescopes and Test Beams Workshop



Contribution ID: 55

Type: **Talk**

## Team SPEEDers - Smith-Purcell Effect Emission Determination (SPEED)

*Wednesday 21 May 2025 13:00 (20 minutes)*

Smith-Purcell radiation (SPR) is a type of radiation emitted by electrons passing closely parallel to a conductive periodic surface, with potential applications in non-invasive longitudinal beam diagnostics. Selected as part of the 2025 Beamline For Schools competition, our team conducted an experiment at the DESY-II test beam facility to measure SPR in the near IR to visible electromagnetic spectrum using a 1-6 GeV electron beam. Blazed gratings with groove densities of 1200, 1800, 2400, and 3600 g/mm were tested for the production of SPR. Micron-level alignment between the beam and the grating is achieved through electron tomography of the grating with the beam telescopes. For optimal single-photon detection, our detector consists of silicon photomultiplier detectors (SiPMs) cooled with dry ice. Data was analyzed to temporally align events between the telescopes and SiPMs, isolate events with high signal-to-noise ratios, and determine their statistical significance.

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