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Spreader design options for a high-throughput multi-user XFEL

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One option being considered to meet the needs of the XFEL user community within the UK is a new national facility capable of producing photon beams with properties identified in the UK XFEL Science Case. The case calls for a high-efficiency facility with a step-change increase in the simultaneous operation of multiple end stations, with high-repetition rate near-transform limited x-ray pulses provided across a wide range of photon energies and pulse durations. Another key capability would be to enable experiments combining hard and soft x-ray pulses, potentially from different beamlines. The beam spreader in this case would need to direct individual electron bunches, separated by a few ns, to adjacent beamlines, while maintaining the beam quality and stability needed to achieve high-power x-ray output. In this paper, we discuss possible spreader configurations and consider the technology requirements and options for critical components. As an example, we present an outline spreader optics design together with initial results from tracking studies aiming to characterise the potential performance.

Footnotes

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