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Investigation of the Beam Losses and Radiation Loads for the Implementation of a Slotted Foil at the European XFEL

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Ultra-short X-ray pulses in an XFEL can be generated by means of a slotted foil inserted into a bunch compressor. There is an ongoing study into whether such a technique could be used at the European XFEL. One important factor that must be considered is whether the additional beam losses and radiation load caused by the foil is acceptable with a high repetition rate of up to 4.5MHz at the European XFEL. As there is currently no foil implemented in the European XFEL, experimental investigations were carried out by inserting a screen in the bunch compressor at the location where a foil would be inserted. Simulations have been performed using BDSIM to study losses caused by the insertion of the foil. Neutron radiation measurements and beam loss monitor readings were taken and compared with the simulations to provide validation and calibration of the simulations for the case of a slotted foil.

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Yes

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