

Physics and Applications of High Brightness Beams



Contribution ID: 68

Type: Poster

Beam dynamics of the RUEDI ultrafast electron diffraction beamline

RUEDI is a proposed facility for ultrafast electron microscopy (UEM) and ultrafast electron diffraction (UED) which is currently being designed and would be built in the UK. It will have two beamlines, one for microscopy and one for diffraction, which share a common electron gun. The diffraction beamline will operate with a kinetic energy of 4 MeV meaning that both space charge and ballistic effects are important. To achieve good temporal resolution the diffraction beamline needs a short bunch and small time of arrival jitter at the sample location. This will be achieved by compressing the bunch using a four dipole variable R56 magnetic arc. This arc will also be tuned to suppress the timing jitter due to the electron gun RF phase jitter. Achieving compression and jitter suppression requires using the bunch's space charge forces to modify its chirp to compress the beam. In addition to the longitudinal dynamics, transverse emittance degradation through the arc must be minimised so that good quality diffraction patterns can be obtained. Simulations showing the bunch compression, jitter suppression and the achieved transverse emittance will be discussed.

Primary author: HOUNSELL, Benjamin (STFC Daresbury Laboratory)

Co-author: MCKENZIE, Julian (STFC Daresbury Laboratory)

Presenter: HOUNSELL, Benjamin (STFC Daresbury Laboratory)

Session Classification: Poster