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Design studies of the electron injector and beam transport for external injection at AWAKE Run 2

Monday, September 16, 2019 7:00 PM (1 hour)

The proton driven plasma wakefield acceleration experiment AWAKE at CERN demonstrated basic electron capturing and acceleration using a rather long electron bunch spreading out over several plasma wavelengths. For the second phase of the experiment, the aim is to inject a short electron bunch with appropriate emittance and charge to achieve full capture and emittance preservation of the injected electron bunch. The correct bunch charge will load the wakefield and lower the energy spread. At the plasma entrance a bunch length of 200 fs, charge of 100 pC and transverse dimensions of 5 μm are needed. The design of the injector consisting of an S-band RF-gun and X-band acceleration and velocity bunching will be presented as well as first ideas of how to transport the beam to the plasma entrance and performing the final focusing.

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