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## Predicting the Trajectories of Relativistic Electron Beams for External Injection in Plasma Wakefield Acceleration

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

The AWAKE project aims to accelerate electrons through proton driven plasma wakefields. The transverse extend of the wakefields is given by the plasma density and is of the order of one millimeter. With external injection, the exact position of the electron bunch in the wakefields determines the acceleration energy and the captured charge. The pointing jitter of the electron beam is of the order of the size of the wakefields, so single event analysis is desired. After the last two beam position monitors (BPMs) the electrons propagate in vacuum. Ballistics can be used to propagate the trajectory to determine the position of the beam with respect to the proton bunch. The co-propagating proton bunch interferes with the electron BPMs readings and they cannot be used to determine the electron trajectory for these common events. Therefore, we have to use BPMs upstream of the common line. We use a model based on beam-optics to propagate the electron bunch before and towards the plasma and predict its point of closest approach to the proton bunch. This method is used to investigate the measured accelerated charge from event to event.

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