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Controlled injection in plasma based acceleration using external magnetic fields JORGE VIEIRA, SAMUEL MARTINS, JOANA MARTINS, VISHWA PATHAK, GoLP/Instituto de Plasmas e Fusao Nuclear-Laboratorio Associado, Instituto Superior Tecnico, Portugal, RICARDO FONSECA, DCTI, ISCTE-Lisbon University Institute, LUIS SILVA, GoLP/Instituto de Plasmas e Fusao Nuclear-Laboratorio Associado, Instituto Superior Tecnico, Portugal, WARREN MORI, University of California, Los Angeles USA — As the principles of plasma based acceleration are now firmly established, significant interest is being devoted to the control of the acceleration processes, critical in applications. In addition, the possibility to use plasma based accelerators technology to provide compact light sources is also being thoroughly investigated. In this work we present a novel controlled injection configuration which uses a transverse static magnetic field to trigger self-injection, and to tailor the final electron bunch properties. This novel scheme can be applied in both laser, and plasma wakefield accelerators, leading to off-axis injection and to coordinated betatron oscillations of the injected bunch. Key features of the emitted radiation will also be analysed by investigating the trajectories of the accelerated electrons. The results are supported by fully-kinetic relativistic particle-in-cell simulations in OSIRIS, complemented by an analytical Hamiltonian model.

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