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Multiple-drive-bunch plasma wakefield acceleration

A train of charged particle bunches can resonantly drive large amplitude wakefields in plasma, when spaced by integers of one plasma wavelength, and high-transformer-ratio wakefields, when spaced by integers of half plasma wavelength and with properly ramped bunch density. We show with numerical simulations that the SPARC_LAB linear accelerator can provide a train of compressed electron bunches via the velocity bunching technique, and that the coupling between the bunch train and plasma can allow for large-amplitude wakefield excitation (resonant configuration) and for high-transformer-ratio acceleration (anti-resonant configuration). We discuss the experimental plan at SPARC_LAB.

Working group

WG3 : Beam-driven plasma acceleration

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