Contribution ID: **2439** Contribution code: **TUPA053** Type: **Poster Presentation**

Role of twisted and two-color laser pulses in particle defocussing and acceleration gradients

Tuesday, 9 May 2023 16:30 (2 hours)

Accelerators having large electric field gradients are the need of the hour for building future electron or proton colliders. Plasma wakefield accelerators using short electron or proton bunches can solve the problem of achieving large amplitude plasma wake. In PWFA, we have witnessed that, large amplitude wakefields generated by such mechanisms have both transverse and longitudinal components of wake, where longitudinal component of the wake is used to accelerate the bunch particle whereas the transverse component is used to focus the electron or proton bunch. We investigated the role of twisted and two-color laser pulse using FBPIC code in defocussing and electron or proton injection into the counter-propagating ionization front. It may be noted that there is no significant defocussing observed for longer distances by using a twisted and two-color laser pulse.

Funding Agency

Footnotes

*Tajima T and Dawson J M 1979 Laser Electron Accelerator Physical Review Letters 43 267–70*Vaziri M, Golshani M, Sohaily S and Bahrampour A 2015 Electron acceleration by linearly polarized twisted laser pulse with narrow divergence Physics of Plasmas 22 033118
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Primary author: MISHRA, Dinkar (Lucknow University)

Co-author: KUMAR, Bhupesh (Lucknow University)

Presenter: MISHRA, Dinkar (Lucknow University)

Session Classification: Tuesday Poster Session

Track Classification: MC3: Novel Particle Sources and Acceleration Techniques: MC3.A15: New Acceleration Techniques