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Ion-ion collisions in plasma wakefield accelerators

Monday 20 May 2024 16:00 (2 hours)

The plasma wakefield accelerator, with acceleration gradients ranging from GeV/m to TeV/m, holds promise for propelling particles to high energies in linear colliders. This results in exceptionally bright beams characterized by intense ion-derived focusing, leading to the collapse of plasma ions. The non-uniform ion density triggers robust nonlinear focusing, potentially resulting in undesirable beam emittance growth. Our study extends prior research focused on electron acceleration by investigating ion-ion collisions, studying different collision models emphasizing the near-equilibrium state post-ion collapse utilizing the OSIRIS PIC code. Notably, our findings reveal that parametric excitations arising from plasma non-uniformity have an insignificant impact on phase space diffusion, a crucial insight for optimizing linear colliders.

Footnotes

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North America

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