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Energy Deposition and Wakefield Excitation of Ion Beam Passing through a Plasma Target

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Here we will report the recent progress on ion beam plasma interaction.
The measured energy loss of 400keV helium ion was much lower than the theoretical predictions.It was also found that, there were quite a few fraction of He1+ after the He2+ ion beam passing though the plasma, so that the effective charge state should be lower than the nuclear charge taken for theoritical calculation.
We also found that, the proton beam were strongly focused after passing through the plasma target, and the energy of the focused proton beam were quite uniform,as means that the proton beam can passing though the plasma target without strong Coulomb collisions. Simulation shows that the wake-field could strongly infulunce the distribution and revolution of the free electrons and form a self-modulated, periodic, focusing, and collision-less tunnel in plasma.

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