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Ion acceleration in the RPA regime by shaped pulses YOUNG-KUK KIM, MIN SUP HUR, UNIST — Recently we presented a controllable pulse shaping by relativistic transparency in non-uniform, overdense plasmas [1]. In this shaping scheme, by tapering the density and thickness of an overdense plasma slab, the pulse front can be carved into various figures such as transversely flat or concave shape with longitudinally sharp pulse fronts. As an application of such a novel scheme of the pulse shaping, we studied the effects of the shaped pulse on ion beam energy, charge, and energy spread in the radiation pressure dominant regime. From the 2-dimensional PIC simulations, we observed that the flat pulse produces more energetic proton beam than a usual Gaussian beam, and concave pulse yields even more abundant proton beam.

[1] M.S. Hur et al., "Versatile shaping of a relativistic laser pulse from a nonuniform overdense plasma," Phys. Plasmas, (accepted, to appear in 2012).

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