

Abstract Submitted  
for the DPP08 Meeting of  
The American Physical Society

**Anisotropic energy spectra of fast ions generated by a laser-cluster interaction analyzed by a collisional PIC code** TOSHIHIRO TAGUCHI, Setsunan University, THOMAS ANTONSEN, HOWARD MILCHBERG, University of Maryland — Energy spectra of fast ions generated through a laser-cluster interaction are analyzed by our newly developed particle-in-cell (PIC) code, which includes both collisional and ionization processes. A solitary cluster is irradiated by a strong laser field in a range of  $10^{14}$ – $10^{17}$ W/cm<sup>2</sup>. The laser field mainly accelerates electrons in the cluster and their fast components escape very rapidly from the core of the cluster to produce a large static field surrounding the cluster. Ions are accelerated by the large static field and then the cluster expands. Since electrons are preferentially accelerated in the direction parallel to the laser polarization, the static field is anisotropic and ions are also accelerated anisotropically. We have analyzed both an argon cluster and a hydrogen cluster for various laser intensities and study the mechanisms of the anisotropic acceleration detail, especially about the relation to the resonant absorption described in the references [1–2]. [1] T. Taguchi, et al., Phys. Rev. Lett., 92, 20, 2004, 205003. [2] T. M. Antonsen, Jr., et al., Phys. Plasmas 12, 5, (2005), 056703.

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Date submitted: 17 Jul 2008

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