Abstract Submitted
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Demonstrated Efficient Quasi-Monoenergetic Carbon-Ion Beams Approaching Fast Ignition (FI) Requirements[1] JUAN C. FERNÁNDEZ, S. PALANIYAPPAN, C. HUANG, D.C. GAUTIER, M. SANTIAGO, Los Alamos National Lab. — Using massive computer simulations of relativistic laser-plasma interactions, we have identified a self-organizing scheme that exploits persisting self-generated plasma electric ($\sim$TV/m) and magnetic ($\sim 10^4$ Tesla) fields to reduce the ion energy spread of intense laser-driven ion beams after the laser exits the plasma [1]. Consistent with the scheme, we have demonstrated on the LANL Trident laser carbon-ion beams with narrow spectral peaks at 220 MeV, with high conversion efficiency ($\approx 5\%$) [1]. These parameters are within a factor of 2 of FI requirements [2]. The remaining gap may be bridged by increasing the laser intensity by a factor of 4, according to our data [1]. We also discuss how this beam may be focused, to address the remaining requirement for FI, besides the total laser energy.

[1] S. Palaniyappan, et al., *Efficient quasi-monoenergetic ion beams up to 18 MeV/nucleon via self-generated plasma fields in relativistic laser plasmas, arXiv*:1506.07548v1; S. Palaniyappan, et al., this conference
[2] J.C. Fernández, et al., *Fast ignition with laser-driven proton and ion beams.* Nuclear Fusion, **54**(5), 054006 (2014)

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