Abstract Submitted
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PIC modeling of fast electron transport in plasmas[1] R. MISHRA, UCSD, T. YABUUCHI, M.S. WEI, GA, Y. SENTOKU, UNR, R.B. STEPHENS, F.N. BEG, UCSD — Understanding fast electron transport in plasma is crucial for fast ignition. A recent experiment [1] using the OMEGA EP laser (1 kJ/10 ps) study of fast electrons transport from the Au layer into hot (40 eV) dense (30 mg/cc) plasma created by shock heating of CH foam sandwiched between Au and Cu tracer layer, showed a strong reduction (20×) in Cu Kαgyield compared to the cold target with a uniform and weak Kα spot. To understand this transport experiment, 2D collisional PIC simulations, using the PICLS code, are performed to model fast electron transport in such plasma transport target. Simulations show a significant increase in fast electron divergence going from high density Au to less dense plasma transport layer due to strong B-fields generated at the Au/CH plasma interface. Fine B-field structures in plasma are also observed, possibly responsible for further electron scattering resulting in poor Kα yield.

[1] T Yabuuchi, "Study of fast electron transport in plasmas using a kJ-class laser pulse," IFSA 2011

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