Abstract Submitted
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The generation of bipolar jets of astrophysical relevance using the OMEGA facility[1] P.-A. GOURDAIN, E.G. BLACKMAN, A. FRANK, D.M. MEYERHOFER, Department of Physics and Astronomy University of Rochester, C.E. SEYLER, Electrical and Computer Engineering Department Cornell University — Bipolar astrophysical plasma jets are generated by young stellar objects, active galactic nuclei and proto-planetary nebulae. They are not only born in harsh environments, they can encounter extreme conditions along the way. Recent observations have made apparent that electron physics impacts the overall dynamics of bipolar plasma jets. For instance, the Hall effect together with Ohmic resistivity can change completely the magnetic field structure inside protoplanetary disks and can alter significantly the magneto-rotational instabilities in the inner regions of the disks. The Hall effect plays a critical role in the magnetic polarity of galactic jets. The numerical simulations presented here show how the OMEGA laser can be used to produce bipolar plasma jets with large Reynolds, magnetic Reynolds and Mach numbers. It will also show how electron physics can break the jet symmetry. A discussion will follow on how to generate similar jets using pulsed-power generators.

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