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Limiting cross-beam energy transfer with laser beam spatial structure[1] BLAINE ARMSTRONG, ROBERT FEDOSEJEVS, ANDREW LONGMAN, JASON MYATT, Department of Electrical and Computer Engineering, University of Alberta, Edmonton, AB, Canada — Schemes to implement laser bandwidth wide enough to mitigate laser-plasma instabilities will be both intrusive and expensive. As an alternate approach, work is presented that investigates the mitigating effects of spatial, rather than temporal, laser beam conditioning on cross-beam energy transfer (CBET) [I.V. Igumenshchev *et al.,* Phys. Plasmas **19**, 056314 (2012)]. Such conditioning might be generated by phase plates alone and could therefore be implemented more easily. We have quantified the energy exchange occurring between crossing laser beams that possess orbital angular momentum (OAM) as the amount of OAM exchange between the beams is varied [*cf. e.g.,* M. Padgett *et al.,* Physics Today **57**, 35 (2004)]. This numerical study was performed in 3-D using the non-paraxial wave-based *LPSE* simulation code [J.F. Myatt *et al.,* J. Comp. Phys **399**, 108916 (2019)]. The mitigating effects are described in terms of the requirement that total angular momentum be conserved and the degree to which a difference in AM between crossing beams limits the acoustic wave response.

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