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P1.2024 Magnetic field generation of kinetic plasma waves carrying orbital angular momentum

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Electromagnetic waves, while propagating through a vacuum, can carry orbital angular momentum [1] this is used in a variety of applications[2, 3]. In this study Langmuir waves carrying finite orbital angular moment are examined within a revised paraxial optics approximation. While Laguerre-Gaussian modes appear to be eigenfunctions of the plasma wave in the fluid description[4], theoretical analysis shows that LG Modes are not eigenfunctions of the electron kinetic equation[5]. Here we find a revised coupling term in the dispersion relation for LG modes as well as an additional term for Landau damping, important at tight focus. A second part of this work is the 2nd order magnetic fields generated by the rotating plasmon structure. Two structures are described (see fig. 1), the first structure is that of a single mode plasma wave, the second structure that of two counter propagating plasma waves.

References
[1] L. Allen, M. W. Beijersbergen, R. J. C. Spreeuw, J. P. Woerd-
man, Orbital angular momentum of light and the transformation of Laguerre-Gaussian laser modes, Phys. Rev. A 45, 8185 (1992).
[2] Q. Zhan, Cylindrical vector beams: from mathematical concepts to applications, Advances Opt. Photonics 1, 1 (2009).
[3] J. Vieira, J. T. Mendonça, Nonlinear laser driven donut wakefields for positron and electron acceleration, Phys. Rev. Lett. 112, 215001 (2014).
[4] J. T. Mendonça, S. Ali, B. Thidé, Plasmons with orbital angular momentum, Phys. Plasmas 16, 112103 (2009).
[5] J. T. Mendonça, Kinetic description of electron plasma waves with orbital angular momentum, Phys. Plasmas 19, 112113 (2012).

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