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Field-Aligned Currents due to Resonant Absorption in a Magnetized Plasma[1] DEAN DAUGER, F.S. TSUNG, J. TONGE, G.J. MORALES, Department of Physics & Astronomy, UCLA — A particle-in-cell code, OSIRIS is used to investigate the currents generated by the resonant absorption of an electromagnetic pulse (EMP) propagating across the magnetic field in a plasma with a cross-field density gradient. The electromagnetic pulse has finite extent along the magnetic field and can be excited with O or X-mode polarization. This situation is of interest in ionospheric modification studies, basic laboratory experiments, RF heating and it could lead to interesting particle acceleration scenarios. As expected, at the resonant layer the O-mode polarization is found to trigger strongly nonlinear processes. One such process consists of the carving of a cross-field density channel and the acceleration of electrons that stream out of the resonant region. The confinement magnetic field allows the development of a collimated current pulse that induces a coaxial return current. The self-consistent plasma response results in the radiation of whistlers as well as shear Alfvén waves. The dependence of the current system on polarization and power of the EMP is investigated and the results are compared to on-going experiments at BaPSF.

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