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Construction of an electron-ion hybrid experiment in a magnetized plasma column AMI DUBOIS, JAMES CREEL, EDWARD THOMAS, JR., Auburn University — Localized radial electric fields in a magnetized plasma column can lead to many plasma instabilities. Previous work in the Auburn Linear Experiment for Instability Studies (ALEXIS) has focused on instabilities in the ion cyclotron regime where the scale length of the radial electric field is of the same order as the ion gyroradius. A new dual plasma source experiment in ALEXIS, a 170 cm long and 10 cm diameter magnetized plasma column, has been designed to study a new regime of instabilities that occur when a sharp, localized, radial electric field scale length is much less than the ion gyroradius but greater than the electron gyroradius. Under these conditions, this electric field is then expected to have little effect on the ions, but the electron trajectories will be modified. This can give rise to an electron-ion hybrid (EIH) instability, which produces a broadband wave spectrum in the lower hybrid frequency range. Both fusion and space plasma studies have made observations of lower hybrid instabilities. This work seeks to understand how regions of sheared electron flows generate may contribute to localized ion heating via wave-particle interactions. This presentation will focus on the setup of this new experiment, as well as initial measurements of radial electric field and electron densities.

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