Plasma phase-space fluctuations\footnote{Work supported by US DOE grant \#DE-FG02-99ER54543.} FRED SKIFF, VIKRAM PATEL, DERETH DRAKE, University of Iowa — The low frequency electrostatic, kinetic, electromechanical degrees of freedom of weakly collisional plasma are studied through the measurement of correlation functions that are resolved in the ion phase-space using laser-induced fluorescence. Fluctuations in a CW magnetized cylindrical plasma column of $n \sim 10^9 \text{ cm}^{-3}$ singly ionized Argon produced by an inductively coupled source are observed using two movable periscopes that image $10\text{mm}^3$ laser-illuminated volumes which can be translated along the magnetic field direction (the cylinder axis). Two-point correlation functions are be obtained which provide information on the linear and nonlinear dynamics of the ion degrees of freedom.