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Measurements of the two-point correlation function for plasma ions[1] FRED SKIFF, University of Iowa, AHMED DIALLO, University of Iowa, ILKER UZUN, University of Iowa — We present extensive measurements of the two-point correlation function for plasma ions in the presence of drift-wave instability in a uniformly magnetized plasma cylinder. By means of laser-induced fluorescence we resolve the measurements in the component of ion velocity parallel to the magnetic field in addition to the spatial coordinates of the two points. Thus we measure f(x,y,z1,vz)*f(x,y,z2,vz) where z is the direction parallel to the magnetic field. In addition to the contribution of the drift wave modes, we observe a kinetic component that has short wavelengths parallel to the magnetic field. The observed wavelengths are such that the kinetic component of the fluctuations has a phase velocity comparable to the ion particle velocities and is found to vary with ion velocity (vz). The kinetic component is also highly asymmetric in propagation direction and shows evidence of nonlinearity (high frequency-harmonic content). At present, there is no adequate explanation for the kinetic component of the fluctuations. We consider the possibility that the drift-waves are coupling energy to the kinetic component despite the fact that the wavelengths differ by two orders of magnitude.

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