Fluctuations properties of space averaged force in a fully turbulent jet. BENJAMIN THIRIA, OLIVIER CADOT, ENSTA, JEAN-FRANÇOIS BEAUDOIN, PSA, UME-ENSTA TEAM, PSA COLLABORATION — We study the fluctuations of a global quantity in a fully turbulent flow: the drag of a disk placed in a turbulent jet, facing perpendicularly to the jet axis. The question is how are the fluctuations of the drag averaged as the size of the disk is increased? For this purpose a piezoelectric transducer is used giving measurements that are reliable until the frequency of 1Khz. The turbulence upstream the disk is characterized by mean of hot wire measurements. The velocity spectrum displays the beginning of the inertial range around 10 Hz and the dissipative scale around 1 kHz. The drag fluctuations measured over the disks can then solves fluctuations having high frequencies as small as those of the dissipative scale. For small disk diameters, the drag statistics are strongly non-gaussian with a stretched exponential tail for large values of the drag. For larger disk diameters the shape of the PDF converges through a shape that is not Gaussian. These PDF are compared to standard statiscal laws. The effect of averaging is also studied on the drag Fourier spectra..

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