



## **New insights into sub-ion scale turbulence in Earth's magnetosheath using MMS data**

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On January 22nd 2016, MMS was located in Earth's magnetosheath and detected intense lion roars showing a secondary bandwidth. Detailed polarization analysis, using burst data from SCM and EDP instruments, and numerical simulation, using WHAMP, are performed in this study. They show that these mainly perpendicular fluctuations are highly nonlinear whistler wave packets, and that a high sampling rate is needed to pick up the peaks of the signal. As a result, their amplitude might have been underestimated in previous missions such as Cluster, which can have a significant impact on electron dynamics. Using FPI burst data, we show that electron velocity distribution functions exhibit a gyrophase-bunched signature in the presence of these lion roars. The analysis of magnetic and density fluctuations, inferred from spacecraft potential, also show the highly-compressible nature of turbulence up to electron scales.