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Mode spectra measurement of particle-particle interaction and upstream potential around dust particles in a plasma sheath.¹ KE QIAO, ZHIYUE DING, JIE KONG, LORIN MATTHEWS, TRUPELL HYDE, CASPER - Baylor University — The interaction potential between dust particles is a fundamental topic in complex plasmas. It is of particular interest for particles in the plasma sheath due to modification of the potential around a dust particle by the ion flow. In this research, we introduce a non-intrusive mode spectra method [1] to study the interaction between a vertically aligned dust particle pair confined in a glass box in a GEC reference cell. The interaction strength between the two particles is measured simultaneously in both the vertical and horizontal directions. The results show an interaction with strong nonreciprocity in both directions and gives a quantitative value for the horizontal attraction on the bottom particle. The method also finds an upstream potential with effective screening length in the vertical direction λ_v greater than λ_h in the horizontal direction. This is in agreement with previous predictions [2] and has to our knowledge, never before been observed experimentally. [1] Ke Qiao, Zhiyue Ding, Jie Kong, Mudi Chen, Lorin S. Matthews, Truell W. Hyde [arXiv:1705.01982](https://arxiv.org/abs/1705.01982) [2] P. Ludwig, W. J. Miloch, H. K. Ahlert, and M. Bonitz, New Journal of Physics, 14 053016 (2012).

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Truell Hyde
CASPER - Baylor University

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