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Measurement of plasma conditions inside the sheath using dust grains[1] KHANDAKER SHARMIN ASHRAFI, MUDI CHEN, DUSTIN SANFORD, LORIN MATTHEWS, TRUELL HYDE, Baylor University — Various types of ordered, dust particle structures can be formed experimentally inside a glass box when it is placed on the lower, powered electrode of a GEC rf reference cell. In this case, the number of particles and the resulting confinement provided by the box can be adjusted by changing the power and/or pressure of the system. The interaction between the dust particles and the ions streaming toward the negatively charged lower electrode creates an ion wake field downstream of the grains, thereby altering the charge on the grains, the local electric field and the ion flow speed. Experimentally, these quantities are difficult to measure independently. This study will present a molecular dynamics simulation of this system and examine how it can be used to study the interaction between the ion wake fields and the dust grains. It will also be shown that the results allow the plasma conditions inside the glass box, including the electric field, the ion flow speed and the dust charge to be determined, even for changing electron density.

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