



# A Consistent Model of Plasma - The Potential in a Glass Box

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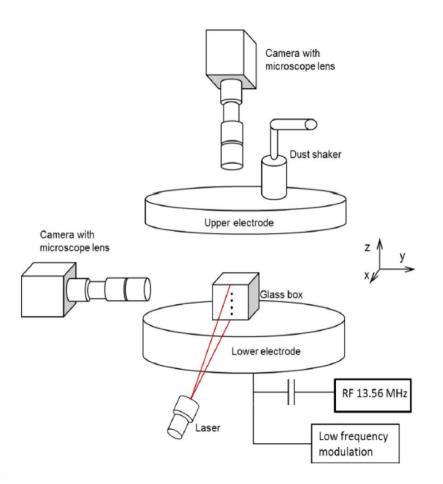


## Overview

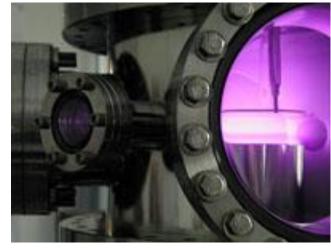
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# About the Experiment



Schematic of Experiment with Glass Box



**GEC Reference Cell** 



# Background

#### **Constant Debye Length**

**Experiment** 

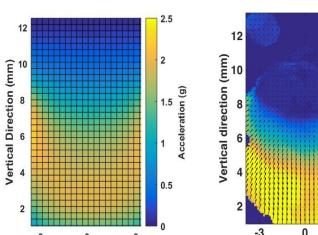
Horizontal direction (mm)

1 ;r Acceleration (g)

0.5

#### Model

Horizontal Direction (mm)

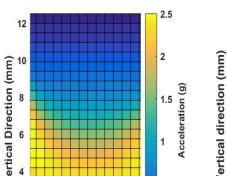


(150 mTorr, 60 V<sub>pp</sub>)

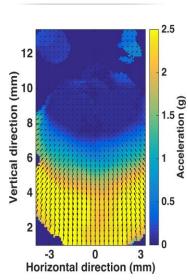
#### **Varying Debye Length**

#### Model

Horizontal Direction (mm)



#### **Experiment**



(150 mTorr, 60 V<sub>DD</sub>)

0.5



### Method

Calc. Potential ( $\Phi$ ) on Walls

Calc. Charges on Walls (Q)



YES

 $E = -\nabla \Phi$ 

**Generate Acceleration Maps** 

$$\Phi = \sum_{n} \frac{k_{e}Q_{n}}{r_{n}} * e^{-\sum_{m} \left(\frac{r_{m}}{\lambda_{D}}\right)}$$

No

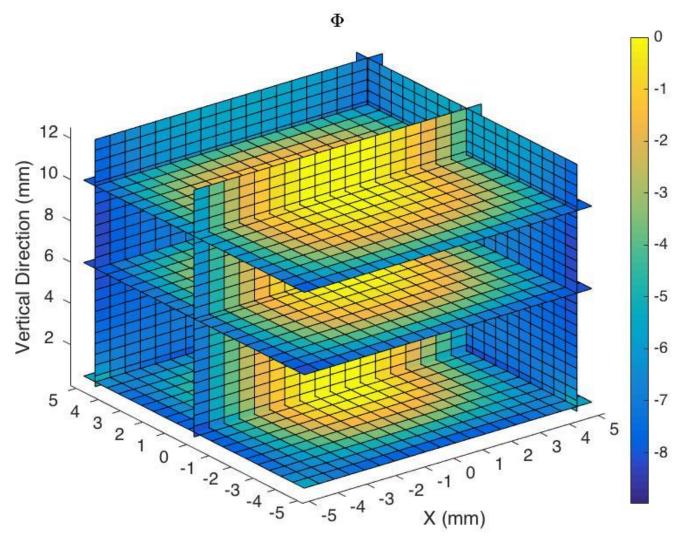
$$= \frac{n_{i,fluidv0}}{\sqrt{\frac{2Fx_{net}\Delta x}{m_i} + \frac{2Fy_{net}\Delta y}{m_i} + \frac{2Fz_{net}\Delta z}{m_i} + 3v_0}}$$

$$n_e = n_0 e^{-\frac{q_e \Phi}{k_b T e}}$$

$$\frac{1}{\lambda_D} = \sqrt{\frac{q_i^2 n_i}{\varepsilon_0 k_b T_i} + \frac{q_e^2 n_e}{\varepsilon_0 k_b T_e}}$$



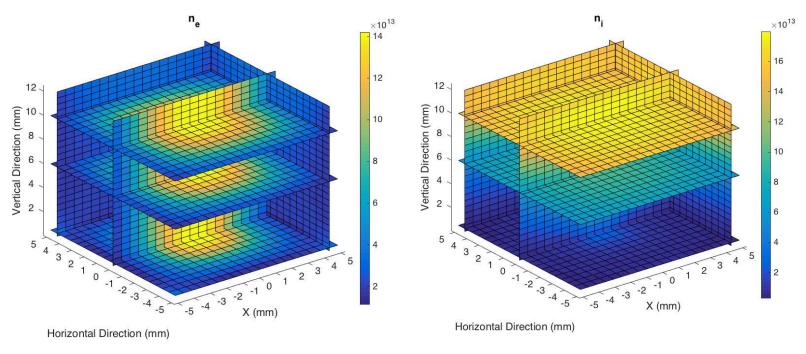
# Results





### Conclusion

More data is needed to progress



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