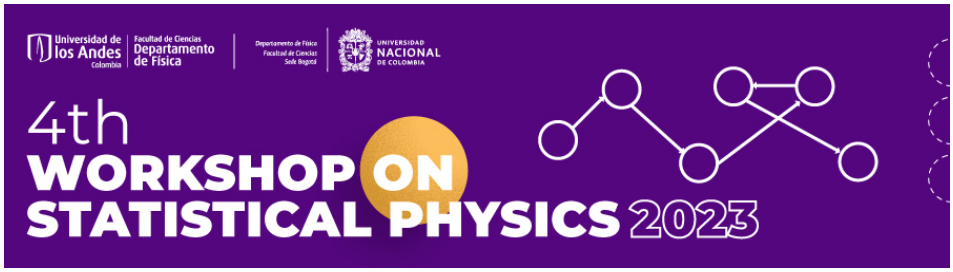

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Comparative Analysis of Surface Charge Density in Planar Metallic Layers: Molecular Dynamics and Method of Moments Approach for Long-Range Interactions

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In this document, we study the planar metallic layers at a constant voltage from the point of view of statistical mechanics and electrostatics. We use molecular dynamics simulations to find the system's positional correlation functions and velocity distributions by modeling it as a two-dimensional Coulomb plasma in the liquid phase. Alternatively, the surface charge density is calculated by implementing the Method of Moments (MoM) under the electrostatic approximation. Point-like and differential charges elements interact via a $1/r^{\eta}$ with $\eta \in \mathbb{R}^{+}$ - electric potential in both cases. We establish the range of the coupling parameter of the system where the surface charge density found in both approaches is in agreement.

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