

Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Electrical impedance of a deforming conducting drop PRIYA GAMBHIRE, V KUMARAN, Indian Institute of Science Bangalore — Deformation of drops under electric field, both direct and alternating, has been a subject of study for nearly 5 decades now. Yet, most theoretical models describing the deformation assume fluids to be either perfect or leaky dielectrics to simplify the analysis. In a real scenario, fluids are rarely dielectric and therefore a complete theoretical description of a conducting drop deforming under an alternating electric field is lacking. Additionally, to validate the models, deformation of drops is estimated in practice via optical methods which can involve expensive piece of equipment such as high-speed cameras. If the deformation can be correlated to drop properties such as its electrical impedance, it can potentially be developed into an electronic method of quantifying the deformation extending the utility of experiments. In this presentation, our attempts to find solutions to both the aforementioned points will be discussed. To describe the deformation, a Debye-Falkenhagen theoretical approach is used which describes ionic double layers. Also, an attempt made to correlate changes in the electrical impedance of the drop and its deformation will be discussed.

Priya Gambhire
Indian Institute of Science Bangalore

Date submitted: 30 Jul 2019

Electronic form version 1.4