

Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

Disjoining pressure in thin liquid films on charged structured surfaces CHRISTIAAN KETELAAR, VLADIMIR AJAEV, Southern Methodist University — We consider thin liquid films on various structured surfaces and compute the electrostatic component of disjoining pressure in the film. The regions of solid phase in contact with the liquid are assumed to be at a constant electrical potential. Presence of ions in the liquid implies that the electrical field there is described by the Poisson-Boltzmann equation. Situations are considered when liquid fills the spaces between the elements of the structure (e.g. grooves) and when pockets of air remain trapped there. The formulas for disjoining pressure are incorporated into a numerical method for calculation of deformations of air-liquid interfaces. Applications of our mathematical model to recent experiments on evaporation of thin liquid droplets on structured surfaces are discussed.

Vladimir Ajaev
Southern Methodist University

Date submitted: 09 Aug 2010

Electronic form version 1.4