A Threshold Method for Wetting Problem on Rough Surface

Xianmin Xu

Chinese Academy of Sciences

Wetting on rough surface is common in nature and industry applications. Mathematically, it is a free interface problem proposed in a complicated domain with rough boundary. In this talk, we will introduce our recent analysis and computations for this problem. We derive a homogenized equation to describe the macroscopic contact angle on rough surface. The equation can describe the local minimizers in the system and thus can be used to describe the contact angle hysteresis phenomena. Then we introduce a volume preserving threshold dynamics method for this problem. The method is simple, stable and very efficient. In each iteration, only one or two convolution operations for functions defined in a regular domain are needed, that can be easily done by some fast algorithms (e.g. the FFT method). This is a joint work with Dong Wang and Professor Xiaoping Wang.