

Depinning force of the Frenkel-Kontorova model

Wen-Xin Qin, Soochow University

Abstract

The depinning force is a critical value of the external force of the Frenkel-Kontorova model (a particles chain with on-site potential and connected with nearest neighbors) under which the system is pinned and above which the system is sliding. In this talk we will explain how the depinning force is connected with the existence of invariant circles of monotone twist maps on the cylinder and discuss its continuity with respect to rotation numbers. Moreover, we show that the depinning force can help us to understand the dynamics, such as the existence of Cantori, for non-exact monotone twist maps. We also discuss Arnold tongues for the dissipative monotone twist maps via introducing the upper and lower depinning force for a particles chain with asymmetric coupling. This is a joint work with Dr. Ya-Nan Wang.