Poster Session | A. Advances in Materials Theory for Multiscale Modeling

[PO-A1]Poster Session 1

Symposium A

2018年10月29日(月) 17:45 ～ 20:00 Poster Hall

[P1-02]Incorporation of double cross-slip in continuum dislocation dynamics

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It is widely agreed that the cross-slip mechanism of screw dislocations plays a key role as crystalline materials deform plastically. In discrete dislocation dynamics (DDD) models, the onset of cross-slip is widely formulated as a random event. However, a proper formulation of cross-slip in models of continuum dislocation dynamics (CDD), where dislocation microstructures are described as a density distribution, is still missing. In this presentation, we present a CDD framework incorporating cross-slip mechanism. The discrete-to-continuum (D2C) transition is carried out by translating the probability of a discrete event into a collective frequency. This work is conducted under the framework of dislocation density potential function (DDPFs), where the mean-field stress can be evaluated with related ease. Numerical examples will be shown to demonstrate the role of cross-slip in the determination of material’s stress-strain relation.