1155-76-412 **Pengtao Yue*** (ptyue@vt.edu), 460 McBryde Hall, 225 Stanger Street, Blacksburg, VA 24061, and **Jiaqi Zhang** (zjiaqi@vt.edu), 460 McByde Hall, 225 Stanger Street, Blacksburg, VA 24061.

Phase-field modeling of contact angle hysteresis and its application in drop impact dynamics.

In reality, most solid surfaces are intrinsically rough or chemically heterogeneous. As a consequence, the contact line may get pinned at topological or chemical defects, which is known as contact angle hysteresis. In this talk, we introduce a thermodynamically consistent phase-field model that accurately captures contact angle hysteresis. The formulation satisfies a dissipative energy law, based on which we develop a finite-element discretization that is at least unconditionally energy-stable in some simple cases. In the end, we use this new method to simulate the transient process of a drop impacting a solid surface, where the drop may deposit, rebound, or partially rebound depending on the drop impact velocity and the surface wetting property. By tuning the hysteresis window, our numerical results can achieve very good agreement with the experimental measurements, which also manifests the importance of hysteresis in contact line dynamics. (Received January 19, 2020)