1036-76-63 **Xinli Wang*** (xw36@njit.edu), Department of Mathematical Sciences, New Jersey Institute of Technology, Newark, NJ 07032, and **Michael Siegel** (misieg@oak.njit.edu). *Simulation of viscous drops rolling on an inclined super-hydrophobic plane.* Preliminary report.

We consider the gravity induced rolling motion of a nonwetting viscous droplet on a flat or tilted solid surface, which is a moving contact line problem with a free surface. One of main difficulties in this problem is the infinite stress singularity at the contact line when we assume an incompressible viscous Newtonian fluid with a no-slip boundary condition on the solid. A 180 degree contact angle is considered as a special case in which the stress singularity is absent. The boundary element method is applied to implement a time-dependent solution of a drop rolling on solid surface with a 180 degree contact angle. An asymptotic solution is enforced at the contact line for which the stress singularity is absent. For small drops, we find the velocity of rolling is proportional 1/R where R is the radius of the drop; for large drops, the velocity of rolling does not depend on the radius of drops. These results are in agreement with a recent theory of Mahadevan and Pomeau. (Received January 08, 2008)