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Velocity Profiles in a Rotating Drum: The Effects of Cohesion ROBERT C. BREWSTER, UCLA, LEONARDO E. SILBERT, Southern Illinois University, Carbondale, GARY S. GREST, Sandia National Laboratories, ALEX J. LEVINE, UCLA — The dynamics of granular media in a rotating drum is important in a wide range of applications in industry associated with mixing granular materials. The rotating drum also serves as a standard experimental geometry to observe continuous avalanching in the laboratory. We study the effect of interparticle cohesion on the velocity field of the rotating drum using large scale granular dynamics simulations. Such cohesion is easily introduced in the system by a wetting fluid that forms menisci at interparticle contacts. Previously, we have examined the effect of interparticle cohesion in gravity driven chute flows, and have shown that the cohesion has a dramatic effect on the granular rheology. For strong enough cohesion, these forces generate a coherently moving plug at the free surface. In this talk, we examine the velocity profile in the rotating drum geometry in this plug-flow regime. We compare our results for angle of the pile in the continuous flow regime to the experiments of Nowak et al. [*Nature Physics*, **1** (2005)] and we examine the stress and velocity profile within the pile as well.

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