

Abstract Submitted  
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**Density Segregation of Granular Materials** ANURAG TRIPATHI,  
D.V. KHAKHAR, Indian Institute of Technology, Bombay — We have studied the segregation of spherical particles of same size with different densities flowing on a rough bumpy inclined surface. An ‘effective temperature’ ( $T_E$ ) relating diffusivity and mobility of the particles, in analogy with Stokes-Einstein relation obtained from the fluctuation-dissipation theorem for jammed systems, has been defined for granular systems. Using the Stokes law for a sphere in a viscous medium, we obtain a simple expression for  $T_E$  as a function of diffusivity  $D$  and viscosity  $\eta$ . A balance of segregation and diffusion fluxes leads to prediction of  $f$ , the fraction of heavy particles in the flowing layer that depends on effective temperature apart from the density difference and inclination of the plane. The proposed theory has no fitting parameter and is able to predict the extent of segregation very well through out the layer for different mixtures, even for systems that are far away from jamming.

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