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Activated processes in a stress landscape: a rheological model for dense driven granular materials[1] BULBUL CHAKRABORTY, DAPENG BI, Brandeis University — We model (Phil. Trans. R. Soc. A 2009 **367**) the rheological behavior of granular materials based on a stress-based statistical ensemble and the Soft Glassy Rheology framework (SGR). It takes into account the disordered nature of granular packings and the metastability of jammed states, as well as spatial heterogeneity and intermittency. In this model, mesoscopic subregions of a driven granular material undergo activated processes in a *stress* landscape with a broad distribution of barrier heights. Due to the athermal nature of granular materials, the activated processes are induced not by the thermodynamic temperature, but by a temperature-like quantity which is a measure of the fluctuation of stresses. Results and predictions of the model have been successfully applied to analyze experiments in a Couette geometry. We will discuss applications of the stress-activated framework in, for example, recent experiments that study non-local rheology in dense flows (PRL **106** 108301(2011)).

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