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**Shear jamming in granular materials**[1]

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For frictionless particles with purely repulsive interactions, there is a critical packing fraction $\phi_J$ below which no jammed states exist. Frictional granular particles in the regime of $\phi < \phi_J$ act differently under shear: early experiments by Zhang & Behringer at Duke University show jammed states can be created by the application of shear stress. Compared to the states above $\phi_J$, the shear-jammed states (SJS) are mechanically more fragile, but they can resist shear. Formation of these states requires the anisotropic contact network as a backbone and these new states must be incorporated into a more general jamming picture (Bi et al Nature 2011). If time permits, I will present some new results from recent experiments at SJTU aimed towards understanding the more detailed nature of SJS and the transition from unjammed states to SJS.

[1]This work is in collaboration with Bob Behringer at Duke University, Dapeng Bi (now at Syracuse) and Bulbul Chakraborty at Brandeis University. The work at SJTU is in collaboration with Ling Zhang and several undergrads in the physics department.