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Experimental measurement of the stress tensor in a granular gas GREG VOTH, WAN JUN YANG, JONAS MISHARA-BLOMBERGER, Wesleyan University, MARK SHATTUCK, City College of New York — We study a quasi-2D granular gas that is vertically vibrated. Precision particle tracking from video at 60 kHz allows us to accurately measure the momentum transfer from individual collisions as well as from particle motion. This allows experimental measurement of the stress tensor. The time averaged stress shows good agreement with the requirement of hydrostatic balance, indicating that we are adequately resolving the stress. Time resolved measurements of the collisional stress show the serrated structure that appears in the shock waves in this system. These measurements allow direct evaluation of the constitutive equation for stress used in hydrodynamic models.

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