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Spatial Force Correlations in 3D Granular Flow .[1] NALINI EASWAR, KELSEY HATTAM, EFROSYNI SEITARIDOU, ALISA STRATULAT, Smith College, Northampton, MA., NARAYANAN MENON, University of Massachusetts, Amherst, MA. — We measure the force delivered at four locations on the boundary of a 3D flow of mono-disperse glass spheres in a vertical, cylindrical chute. A variable opening at the bottom is used to change the flow velocity v_f from 3 to 30cm/s. The force is measured at 80KHz, allowing us to resolve individual collisions. We measure two-point spatial correlations in the flow direction and normal to it. The equal-time correlation between forces that are higher than a threshold shows a weak but measurable spatial correlation. This correlation shows no spatial directionality or dependence on flow rate. The time correlations are synchronous between diametrically opposed locations, and shifted in time between locations along the flow. From the time-lag we determine that the correlations are carried up the flow at speeds $\sim 1000\ v_f$. This speed increases as the flow approaches jamming.

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