

Supplementary Materials for

Microscopic structure and dynamics study of granular segregation mechanism by cyclic shear

Zhifeng Li, Zhikun Zeng, Yi Xing, Jindong Li, Jie Zheng, Qinghao Mao, Jie Zhang, Meiyang Hou, Yujie Wang*

*Corresponding author. Email: yujiewang@sjtu.edu.cn

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The PDF file includes:

Fig. S1

Other Supplementary Material for this manuscript includes the following:

(available at advances.sciencemag.org/cgi/content/full/7/8/eabe8737/DC1)

Movies S1 and S2

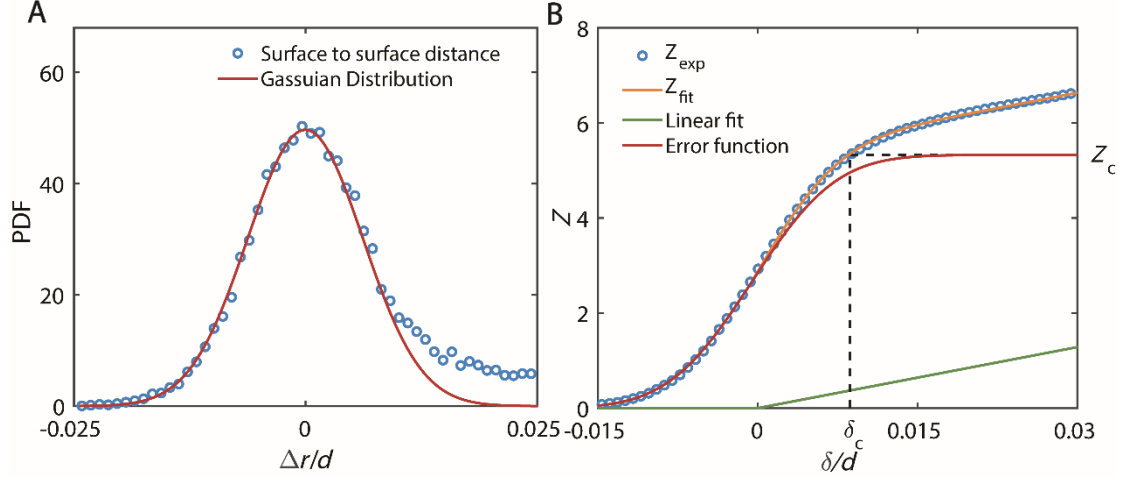


Fig. S1. Fitting of a complementary error function. (A) The probability distribution function of surface-to-surface distance Δr among neighboring particles. The Gaussian core (red curve) results from the experimental uncertainties on contacting particles as two contacting particles can be misidentified as either penetrating into or having a gap from each other. The fat tail at $\Delta r / d > 0$ stems from the contribution from neighboring but not contacting particles. (B) The complementary error function fitting to yield the critical threshold δ_c of surface-to-surface distance and the corresponding global average contact number Z_c . Two particles are taken to be in contact if their surface to surface distance Δr is below a certain threshold value δ . The relationship between average contact number Z and the threshold value δ , as shown by blue symbols, is the accumulating behavior of the pdf of surface-to-surface distance distribution in (A), which can similarly be described by the sum of an error function for experimental uncertainties on contacting particles (red curve) and a linear behavior for non-contacting neighbors (green curve). By fitting the experimental distribution with above model (yellow curve), we can obtain the correct value of Z_c and then extract the δ_c .