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**Interaction forces in bi-disperse particulate systems**[1] XIA MA, Los Alamos National Laboratory, DUAN ZHANG, Los Alamos National Laboratory
— In many granular flow models, the average motion of two types of particles is described by two averaged momentum equations. The interactions between two types of particles are solely represented by the averaged interaction forces in the momentum equations. There are examples in the literature that regard the sum of the interaction forces in the two momentum equations as zero for reasons related to the action-and-reaction principle. Unfortunately, such application of the action-and-reaction principle is incorrect, because the interaction forces are averaged under different conditions. The interaction force for one type of particle is averaged under the condition that the corresponding spatial point is occupied by that type of particle. A given spatial point cannot be occupied by two types of particles at the same time. In this presentation, we will show that the sum of the averaged interaction forces is a divergence of a stress tensor. Numerical simulations are performed to investigate the averaged interaction forces acting on two different sizes of particles undergoing relative motion. The stresses and average interaction forces between two different types of particles are computed.

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