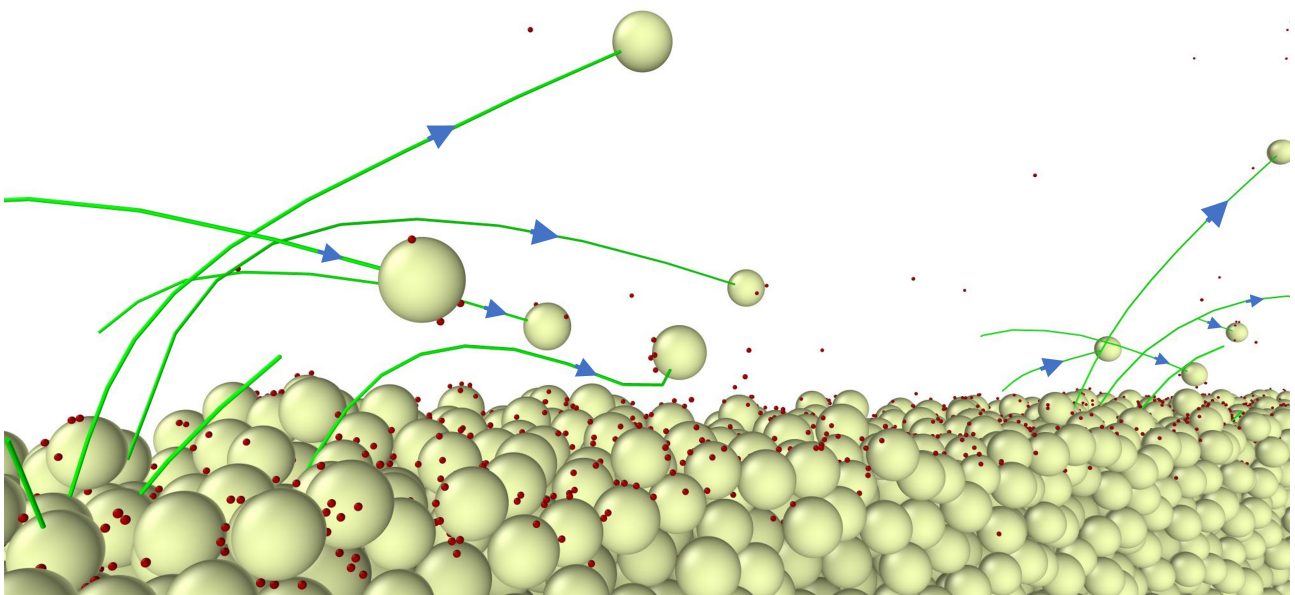




Discrete element modeling of stochastic dust emission and transport

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Wind-blown dust, carried to great heights into the atmosphere can stay there for long periods, having significant impacts on our climate. Thus, an accurate quantification of dust would reduce the large uncertainties in the current climate projections. Using Discrete Element Methods (DEM), we model the sand transport and the concatenated dust emission by directly computing individual particle trajectories. Our numerical simulations account for the underlying contact physics, including attractive inter-particle interactions (van der Waals), coupled with hydrodynamics. The simulations show that sand bombardment is one of the major mechanisms for the emission of both distinct dust grains and sand-dust aggregates. In this seminar, I would like to elucidate this process evolving under turbulent fluctuations arising from the stochastic nature of transport and the critical role of inter-particle cohesion.