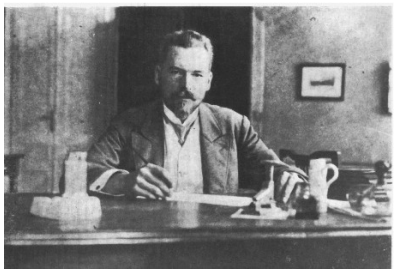

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# Binary mixtures of driven Brownian hard spheres in periodic potentials in one dimension

*Tuesday, 26 September 2023 16:31 (1 minute)*

We discuss the impact of polydispersity on particle currents generated by Brownian hard spheres when they are driven through periodic potentials by a constant drag force. Considering random mixtures of two types of spheres, we explain the variation of the currents with the mixing ratio of the two components and with the hard-sphere diameters. A basic unit cell exists in the space of the two hard sphere diameters. Knowing the behavior of observables in the basic unit cell yields their behavior for arbitrary values of the diameters. The underlying mapping of observables explains repeating features in the dependence of currents on the particle size. The overall variation of particle currents with the mixing ratio and hard sphere diameters is reflected by their variation in the limit where the system is fully covered by hard spheres. In this limit, the currents can be predicted analytically. Our analysis explains the occurrence of pronounced maxima and minima of the currents by changes of an effective potential barrier for the center-of-mass motion.

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