TAGGED PARTICLE DIFFUSION IN DETERMINISTIC DYNAMICS: OLD AND NEW RESULTS

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I will consider the $M \to 0$ limit for tagged particle diffusion in a 1-dimensional Rayleigh-gas, studied originaly by Sinai and Soloveichik (1986), respectively, by Szasz and Tóth (1986). In this limit we derive a new type of model for tagged paricle diffusion, with inverse quadratic (Calogero–Moser) interaction potential between the two central particles. Computer simulations on this new model reproduce exactly the numerical value of the limiting variance obtained by Boldrighini, Frigio and Tognetti (2002). I will also present new bounds on the limiting variance of tagged particle diffusion in (variants of) 1D Rayleigh gas which improve some bounds of Szasz, Tóth (1986). The talk will be partly based on joint work of the following three authors: Peter Balint, Bálint Tóth, Peter Tóth.