



**Conference on Long-Range Interacting Many-Body Systems:
from Atomic to Astrophysical Scales
(25 - 29 July 2016)**

Venue: ICTP Leonardo da Vinci Building - Budinich Lecture Hall
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Title:

Rigorous Derivation of the Vlasov equation

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Abstract:

Solving the evolution equation for an interacting N-particle system analytically or numerically is, in many cases, very difficult or even impossible. However, there are situations where the correlations between the particles are negligible. In many such cases it is possible to give an effective one-particle descriptions which explains most of the physics, and to prove the validity of this effective description with mathematical rigor when N goes to infinity ("derive the equation"). One of the most basic systems one can think of is the dynamics of N stars forming a galaxy, interacting via gravitation. The effective one particle description one expects to be valid is the Vlasov equation. Deriving the Vlasov equation for this system is, however, still an open problem: the technical difficulty comes from the singularity of the interaction. In the talk I will present recent results where the interaction is slightly changed by an N-dependent cutoff.