DK Seminar

March 25, 2015, 14:00 - 15:30
University of Vienna
Oskar-Morgenstern-Platz 1, WPI, 8th floor, Seminarroom.

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Myxobacteria - To Collide or Not To Collide

Joint work with Pierre Degond and Hui Wu

Myxobacteria are soil-living single-cell organisms that can form complex macroscopic patterns such as aggregates and, most fascinating, interacting waves. My main interest here is to derive a good macroscopic model.
To model the bacteria's behaviour I persued two different paths:

(1) Collision based, which leads to a mathematically hard to handle Boltzmann-type equation (last talk)
(2) Reference direction based, which leads to a Fokker-Planck-type equation

Both paths soon run into the difficulty of finding enough conserved quantities to derive the macroscopic equations. However for Option (2) these problems can be overcome quite elegantly by the use of Generalized Collision Invariants, a method I will present and apply.