

# Physikalisches Kolloquium

Donnerstag, 31.01.2019, 16:30 Uhr – Hörsaal 5J

## Understanding the structure of simple and complex liquids: what we know that Mr. Kirkwood did not know.

Prof. Dr. Robert Evans

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The great L.D. Landau argued that there is no theory of liquids; he did not write about liquids in his famous books. J.G. Kirkwood took a different track. This talk will address basic questions on what distinguishes a liquid from a gas or from a crystalline solid and how the form of the pair correlation function  $g(r)$  reflects the nature of the ordering.

How  $g(r)$  decays at large  $r$  defines *crossover* lines in the phase diagram. These lines are not phase boundaries but point to i) how repulsive and attractive interparticle forces compete to determine structure and ii) how in experiments and simulations on binary colloidal mixtures with different sizes, the presence of two different length scales leads to a sharp structural crossover line: the three  $g_{ij}(r)$  decay with a common (short) wavelength on one side and with long wavelength on the other.

For certain one-component models with pair potentials exhibiting two (suitably chosen) competitive length scales, we find a structural crossover line that points, at high packing, to where in the phase diagram quasi-crystals might form.

We reflect upon what is known about the structure of liquids.

**Ab 16:00 Uhr Kaffee, Tee und Gebäck im Foyer vor dem Dekanat der Math.-Nat.-Fakultät  
(Gebäude 25.31. Ebene 00)**

**Für die Dozenten der Physik  
Prof. Dr. J. Horbach**