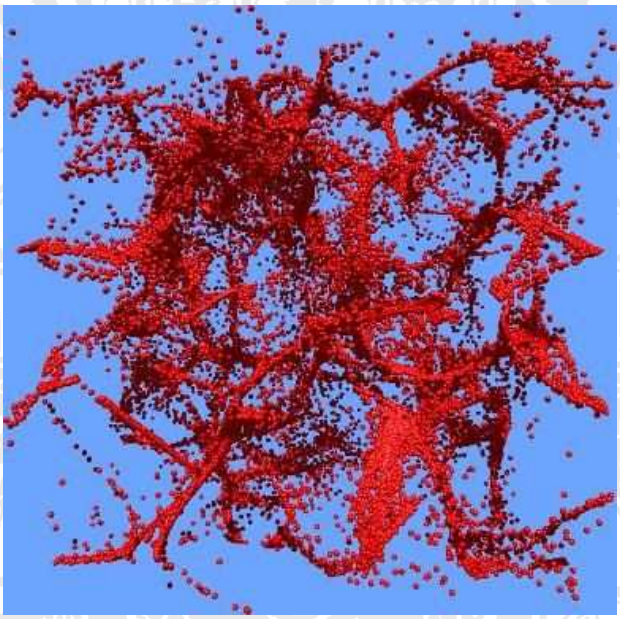
PHYSIKALISCHES KOLLOQUIUM

AM 25. OKTOBER 2010 UM 17 UHR C.T.

IM GROßEN HÖRSAAL



TURBULENT AEROSOLS

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Turbulent aerosols (particles suspended in a turbulent fluid) are fundamental to understanding chemical and kinetic processes in many areas in the natural sciences, and in technology.

An example is the problem of rain initiation. It has been argued that small-scale turbulent motion may facilitate the coalescence of microscopic water droplets (“visible moisture”) into raindrops. This idea has a long history, but a satisfying theory has been elusive, and the topic remains a subject of intensive research. Other examples are the dynamics of soot particles in the turbulent gas flow in diesel-engine exhausts, and buoyant particles on the surface of a turbulent liquid, and settling of particles under gravity in turbulent flows. Turbulent aerosols are also of great importance to more fundamental questions, such as the problem of planet formation. It is not yet understood how the planets in our solar system formed out of the dust around the growing sun; too little is known about the collisions, interactions, and aggregation processes of the dust grains.

In this talk I summarise recent analytical progress in understanding clustering and collision processes in turbulent aerosols. By way of example I describe three new results.