73rd MSS-Seminar

Tuesday, June. 2nd, 15:30

Nägelsbachstr. 49b

special date

MSS

On Planets and other small things: Gas flow in dust beds at low pressure

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The work behind this talk is motivated by problems of planet formation some billion years ago and the martian surface today. Both settings share the presence of large dusty or granular structures embedded in a low pressure atmosphere. At Knudsen numbers larger or equal to 1 porous structures efficiently pump gas in the face of temperature gradients. Dust beds which are illuminated show specific temperature profiles, which allow thermal creep pumping in parts. This results in an overpressure in other parts. I will show some recent experiments on the effects from pure gas flow to the destruction of dust aggregates by overpressure. In other experiments the gas flow leads to a propulsion of individual grains or porous dust aggregates. Depending on the setting dominating effects are photo-phoresis, thermophoresis, thermal creep and Knudsen compression. I will sketch our understanding of the observed phenomena and also set this into the astrophysical context.