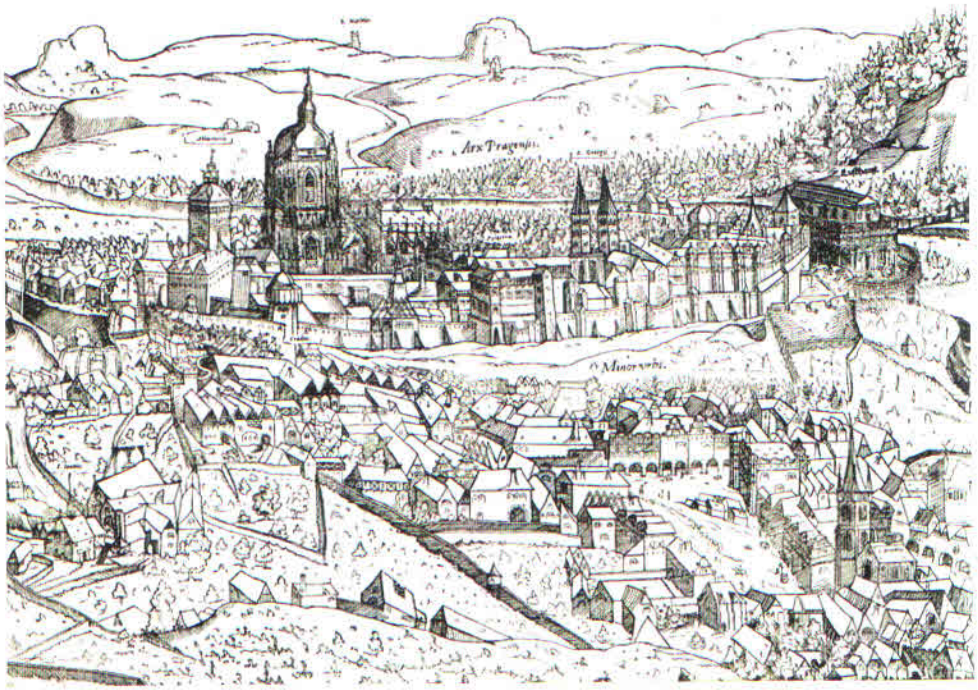
gicpdp

Prague
May 2017



Book of Abstracts

8th International Conference on the Physics of Dusty Plasmas
May 20–25, 2017, Prague, Czech Republic

FACULTY
OF MATHEMATICS
AND PHYSICS
Charles University

8th International Conference on the Physics of Dusty Plasmas

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Diffusion in Two-dimensional Quasi-magnetized Rotating Dusty Plasmas

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Abstract. Transport phenomena in two dimensions are of ongoing interest due to unsolved theoretical challenges and the recent appearance of an increasing number of (effectively) two dimensional materials. Strongly coupled dusty plasmas provide unique possibilities for the microscopic understanding of such classical macroscopic phenomena. Transport properties of single layer dusty plasmas have been the focus of strongly coupled dusty plasma research since the early years of the field. These efforts have provided a very detailed analysis of non-magnetized systems employing both laboratory experiments and numerical simulations. Until recently, however, an external magnetic field was accessible only through numerical investigations. In experiments, the application of real magnetic fields introduces two fundamental problems, namely the disturbance of the background gas discharge and the need for an unrealistically high magnetic field to magnetize the dust component. In this experiment a high quasi-magnetic field is simulated experimentally by rotating a single layer dusty plasma particle cloud and observing the resulting particle trajectories in a co-rotating frame. Based on the Larmor-theorem, effective magnetic fields as large as 3000 Tesla can be achieved without disturbing the discharge. Self-diffusion in these quasi-magnetized strongly coupled systems is measured through the mean square displacement and compared to numerical simulations of magnetized two-dimensional Yukawa systems. Both experiment and simulation shows reasonable agreement supporting the predicted super-diffusion of such systems at accessible time-scales.

Monday (May 22nd) AM

Chairman: **Andre Melzer**

coffee break

Chairman: **Alexander Piel**

lunch break