HOW MUCH DUST DOES ENCELADUS EJECT? S. Kempf[1] M. Horanyi[1], J.Schmidt[2], and B. Southworth[1], [1]Laboratory for Atmospheric and Space Physics, U. of Colorado, Boulder, CO 80303, USA (sascha.kempf@colorado.edu), [2]Department of Physics, University of Oulu, Finland.

Introduction: There is an ongoing argument how much dust per second the ice volcanoes on Saturn's ice moon eject. By adjusting their plume model to the dust flux measured by the Cassini dust detector during the close Enceladus flyby in 2005, Schmidt et al. [1] obtained a total dust production rate in the plumes of about 5 kg/s. On the other hand, Ingersoll and Ewald [2] derived a dust production rate of 51 kg/s from the total plume brightness. Knowledge of the production rate is essential for estimating the dust to gas mass ratio, which in turn is an important constraint for finding the plume source mechanism.

In this talk we report on numerical simulations of the Enceladus dust plume. We run a large number of dynamical simulations including gravity and Lorentz force to investigate the earliest phase of the ring particle life span. The magnetic field in the vicinity of Enceladus is based on the model by Simon et al. [3]. The evolution of the electrostatic charge carried by the initially uncharged grains is treated self-consistently. Our numerical simulations reproduce dust measurements by the Cassini Cosmic Dust Analyzer (CDA) during Cassini plume traversals as well as the snowfall pattern derived from ISS observations of the Enceladus surface. Based on our simulation results we are able to draw conclusions about the dust production rate as well as whether the Enceladus dust plume constitutes a dusty plasma.

References: [1] Schmidt J. et al. (2008) *Nature, 451,* 685–688. [2] Ingersoll A. P. and Ewald S. P. (2011) *Icarus, 216,* 492-506. [3] Simon S. et al. (2011) *JGR,* 116, A04221.