MODELING EUROPA'S DUST PLUME.

B. Southworth[1], S. Kempf[1], J. Schmidt[2], M. Horanyi[1].
[1]LASP, University of Colorado, USA, [2]University of Oulu, Finland.

Introduction: The discovery of Europa maintaining a probably periodic water plume located at its south polar terrain constitutes a huge scientific opportunity for an upcoming mission to this Galilean moon. Measuring the properties of material emerging from interior sources offers a unique scientific opportunity to understand the conditions at Europa's subsurface ocean.

We adjusted the Enceladus subsurface plume model by Schmidt et al. [3] to the conditions at Europa for a size-dependent speed distribution of emerging ice particles, and the particle dynamics model from Kempf et al. [1] to run simulations of plumes on Europa. Two plume locations were taken from Roth et al. [2], and other locations chosen based on currently available data. We then explored the parameter space of Europa dust plumes with regard to ejecta speed distribution parameters and plume location, saving a resulting 3-dimensional particle density structure and map of particle fallback on the surface of Europa for each parameter set. Our simulations provide an extensive library documenting the possible structure of Europa dust plumes, which can be quickly refined as more data on Europa dust plumes is collected.

References:

[1] Kempf, S. et al., 2010. *Icarus* 206, 446–457.
[2] Roth, L. et al., 2014. *Science* 343, 171–174.
[3] Schmidt, J. et al., 2008. *Nature* 451, 685–688.