

## Dr. Björn J. R. Davidsson (July 2022)

### Relevant experience

Thermophysical modeling of small icy bodies (comets, Centaurs, TNOs) and of the surfaces of atmosphereless bodies (asteroids, the Moon); developer of the thermophysics computer code *NIMBUS* (Numerical Icy Minor Body evolution Simulator); Direct Simulation Monte Carlo (DSMC) modeling of comet comae; Discrete Dipole Approximation (DDA) modeling of light scattering; radiative transfer in solid particulate media; tidal breakup mechanics. Co-Investigator of *Rosetta/OSIRIS*, *Comet Interceptor*, *CAESAR* (New Frontier 4 mission proposal), *Centaurus* (Discovery 2019 mission proposal).

### Education

1994-1998: Master of Science (Major in Physics), Uppsala University (UU), Sweden.  
1998-2003: PhD in Theoretical Astrophysics, UU, Sweden.

### Employment history

May 2003 – Apr 2005: Research Fellow, ESA/ESTEC, Noordwijk, The Netherlands  
Sep 2005 – Feb 2010: Research Associate, Dept. of Physics and Astronomy, UU, Sweden  
Oct 2008 – Apr 2009: Visiting Scientist, Jet Propulsion Laboratory, Pasadena (CA), USA  
Mar 2010 – Mar 2016: Researcher, Dept. of Physics and Astronomy, UU, Sweden  
Mar 2016 – present: Scientist V, group 3224, Jet Propulsion Laboratory, Pasadena (CA), USA

### Awards

2002: *Paul Pellas – Graham Ryder Award* for 2001 (The Planetary Division of the Geological Society of America / The Meteoritical Society)  
2003: Naming of *Asteroid (11798) Davidsson*  
2009: *The Edlund Prize* (The Royal Swedish Academy of Sciences)  
2011: *NASA Group Achievement Award* to MIRO Flight Operations Team  
2017: *JPL Team Award* to MILO (Microwave Lunar Observer) Proposal Team  
2018: *The Voyager Award* (JPL, twice)

### Publications and Reviews

149 publications in refereed journals, 22 as first author (5 as single author). h-index 49.

### Selected Publications

Davidsson, B. J. R., N. H. Samarasinha, D. Farnocchia, P. J. Gutiérrez (2022). Modelling the water and carbon dioxide production rates of Comet 67P/Churyumov-Gerasimenko. *Mon. Not. R. Astron. Soc.* 509, 3065-3085.

Davidsson, B. J. R., and S. Hosseini (2021). Implications of surface roughness in models of water desorption on the Moon. *Mon. Not. R. Astron. Soc.* 506, 3421-3429.

Davidsson, B. J. R. (2021). Thermophysical evolution of planetesimals in the primordial disc. *Mon. Not. R. Astron. Soc.* 505, 5654-5685.

Davidsson, B. J. R., S. Birch, G. A. Blake, D. Bodewits, J. P. Dworkin, D. P. Glavin, Y. Furukawa, J. I. Lunine, J. L. Mitchell, A. N. Nguyen, S. Squyres, A. Takigawa, J.-B. Vincent, K. Zacny (2021). Airfall on Comet 67P/Churyumov-Gerasimenko. *Icarus* 354, 114004.

Weissman, P., A. Morbidelli, B. Davidsson, J. Blum (2020). Origin and Evolution of Cometary Nuclei. *Space. Sci. Rev.* 216, 6.

Davidsson, B. J. R., Sierks, H., Güttler, C., Marzari, F., Pajola, M., Rickman, H., A'Hearn, M. F., Auger, A.-T., El-Maarry, M. R., Fornasier, S., Gutierrez, P. J., Keller, H. U., Massironi, M., Snodgrass, C., Vincent, J.-B., and 33 colleagues (2016). The primordial nucleus of comet 67P/Churyumov-Gerasimenko. *Astron. Astrophys.* 592, A63.

Sierks H., C. Barbieri, P. L. Lamy, R. Rodrigo, D. Koschny, H. Rickman, H. U. Keller, J. Agarwal, M. F. A'Hearn, F. Angrilli, A.-T. Auger, M. A. Barucci, J.-L. Bertaux, I. Bertini, S. Besse, D. Bodewits, C. Capanna, G. Cremonese, V. Da Deppo, B. Davidsson and 46 colleagues (2015). On the nucleus structure and activity of comet 67P/Churyumov-Gerasimenko. *Science* 347, aaa1044.

Davidsson, B. J. R., and 46 colleagues (2015). Orbital elements of the material surrounding comet 67P/Churyumov-Gerasimenko. *Astron. Astrophys.* 583, A16.

Davidsson, B. J. R., H. Rickman, J. L. Bandfield, O. Groussin, P. J. Gutierrez, M. Wilska, M. T. Capria, J. P. Emery, J. Helbert, L. Jorda, A. Maturilli, T. G. Mueller (2015). Interpretation of thermal emission. I. The effect of roughness for spatially resolved atmosphereless bodies. *Icarus* 252, 1-21.

Davidsson, B. J. R., and H. Rickman (2014). Surface roughness and three-dimensional heat conduction in thermophysical models. *Icarus* 243, 58-77.

Davidsson, B. J. R., P. J. Gutierrez, O. Groussin, M. F. A'Hearn, T. Farnham, L. M. Feaga, M. S. Kelley, K. P. Klaasen, F. Merlin, S. Protopapa, H. Rickman, J. M. Sunshine, P. C. Thomas (2013). Thermal inertia and surface roughness of comet 9P/Tempel 1. *Icarus* 224, 154-171.

Davidsson, B. J. R., S. Gulkis, C. Alexander, P. von Allmen, L. Kamp, S. Lee (2010). Gas kinetics and dust dynamics in low-density comet comae. *Icarus* 210, 455-471.

Gutierrez, P.J., and B. J. R. Davidsson (2007). Non-gravitational force modeling of Comet 81P/Wild 2. II. Rotational evolution. *Icarus* 191, 651-664.

Davidsson, B. J. R., and P. J. Gutierrez (2006). Non-gravitational force modeling of comet 81P/Wild 2. I. A nucleus bulk density estimate. *Icarus* 180, 224-242.

Blum, J. R. Schräpler, B. J. R. Davidsson, J. M. Trigo-Rodríguez (2006). The physics of protoplanetary dust agglomerates. I. Mechanical properties and relations to primitive bodies in the Solar System. *Astrophys. J.* 652, 1768-1781.

Davidsson, B. J. R., and P. J. Gutierrez (2005). Nucleus properties of comet 67P/Churyumov-Gerasimenko estimated from non-gravitational force modeling. *Icarus* 176, 453-477.

Davidsson, B. J. R., and P. J. Gutierrez (2004). Estimating the nucleus density of comet 19P/Borrelly. *Icarus* 168, 392-408.

Davidsson, B. J. R., and Y. V. Skorov (2002). On the light-absorbing surface layer of cometary nuclei. II. Thermal modeling. *Icarus* 159, 239-258.

Davidsson, B. J. R., and Y. V. Skorov (2002). On the light-absorbing surface layer of cometary nuclei. I. Radiative transfer. *Icarus* 156, 223-248.

Davidsson, B. J. R. (2001). Tidal splitting and rotational breakup of solid biaxial ellipsoids. *Icarus* 149, 375-383.

Davidsson, B. J. R. (1999). Tidal splitting and rotational breakup of solid spheres. *Icarus* 142, 525-535.