



Dust Properties in the Trail of Comet Churyumov-Gerasimenko

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We present optical and infrared ($24\ \mu\text{m}$) images of the dust trail of comet 67P/Churyumov-Gerasimenko near aphelion, obtained with the Wide Field Imager at the MPG/ESO 2.2m telescope in La Silla and with NASA's Spitzer Space Telescope, respectively. Based on these images, we constrain the size distribution and material properties of mm-sized dust grains emitted from the comet. These particles remain close to the comet's orbit because of weak radiation pressure and low emission speeds, thus forming the comet's dust trail. Mm-sized particles are thought to contain a significant fraction of the total mass which a comet contributes to the interplanetary dust environment. We evaluate the size distribution of the trail particles by fitting simulated images to the measured intensities. As far as possible, the parameters of the underlying model are derived from the observed emission history of Churyumov-Gerasimenko. The size distribution is a crucial parameter for estimating the number density of large particles in the neighbourhood of the comet nucleus and for the safety of ESA's Rosetta spacecraft which will pass through the trail region on its approach to Churyumov-Gerasimenko in 2013.