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Gas outflow and dust transport of comet 67P/Churyumov-Gerasimenko

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Because of the diurnal thermal cycle and the irregular shape of the nucleus, gas outflow of comet 67P/Churyumov-Gerasimenko could be highly anisotropic as possibly indicated by the colliminated dust jet structures on the sunlit side. Based on the preliminary study of the outgassing effect from the early phase of the Rosetta mission, a simple model of surface sublimation can be constructed by taking into account the dependence on the solar insolation. By implementing the time variability of the global gas production rate, a sequence of gas coma models can be generated at different epochs before and after perihelion by using an advanced DSMC code [1, 2] to calculate the gas flow near the cometary nucleus. At selected time intervals, we will also investigate the size change of the cometary ionosphere as the nucleus rotates as well as the ejection of dust particles dragged by the gas flow into bounded and unbounded trajectories.

Reference:
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