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Hybrid Plasma Simulation Studies of Coma Anisotropies

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We present hybrid plasma simulations at comets with an anisotropic activity pattern. The investigation demonstrates the modification of the global plasma environment of a weak comet due to anisotropies in its coma. From Earth-based observations as well as from in-situ spacecraft measurements the coma of many comets is ascertained to be anisotropic. However, most plasma simulation studies deploy a spherically symmetric activity pattern. In this paper anisotropy is studied by considering three different coma shape models. These shape models feed a fully 3-D hybrid plasma model which treats electrons as a massless, charge-neutralizing fluid, whereas ion dynamics are covered by a kinetic approach. The simulations have been carried out for the Rosetta target comet 67P/Churyumov-Gerasimenko. Two heliocentric distances covering two distinct different states of nucleus activity and the solar wind plasma are considered.