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Venus day- and nightside oxygen exosphere

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We present the hot (suprathermal) oxygen exosphere densities on the day- and nightside at Venus. To obtain the hot exosphere density profiles, the non-thermal energy distribution functions at the exobase must be known. Therefore the hot particles generated via photochemical processes are traced along their stochastic way through the thermosphere of Venus by using a Monte-Carlo model, and the kinetics and transport characteristics of these particles are determined. In this model we consider elastic, inelastic, and quenching collisions between the traced hot particle and the ambient neutral atmosphere as well as differential cross sections to determine the scattering angle in the collisions. We also include rotational and vibrational excitation energies for the calculation of the initial energy of the produced hot oxygen atoms and use an electron temperature dependent rate coefficient to calculate the production rate of the hot particle. The exosphere density is obtained from the corresponding energy density and angular distribution at the exobase altitude by using a test particle model which traces the ballistic trajectories of hot O atoms in the exosphere. Our results indicate that the differential cross sections and the fraction between elastic, inelastic, and quenching collisions are the most sensitive parameters which effect the corona density.