

Charge Exchange in the Exospheres of Venus and Mars

Konrad Dennerl

The nonmagnetic planets Venus and Mars are surrounded by exospheres which are exposed to the highly charged heavy solar wind ions in a similar way as comets. Consequently, charge exchange induced X-ray emission (CXE) is also generated there. Compared to comets, however, the study of CXE in planetary exospheres is more challenging, due to the considerably smaller solid angle of the emission region and the competing contribution of scattered solar X-rays. Nevertheless, it has been possible to detect CXE unambiguously from Venus and Mars. In an XMM-Newton observation of Mars which occurred at fortunate solar wind conditions, detailed temporal, spatial, and spectral studies became possible. They revealed several X-ray flares of the Martian exosphere in response to episodes of enhanced solar wind flux, allowed the exospheric X-ray emission to be traced out to ~ 8 Mars radii, and made it possible to deduce a CXE spectrum with a resolution of ~ 4 eV. The talk will summarize the current observational state as well as the challenges, prospects and key questions of CXE studies in the exospheres of our neighboring planets.