

# Charge Exchange Emission of Comets in X-ray and the Extreme UV

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The interaction of the solar wind with the planets, moons and the interstellar medium is of key importance for understanding the evolution of our solar system. The interaction with Earth's atmosphere is best known for the northern light. In case of Mars, the interaction with the solar wind might have lead to the erosion of its atmosphere. Solar wind-atmosphere interactions can be studied particularly well in comets, because in that case the solar wind flow is not attenuated by a planetary magnetic field and interacts directly with its atmosphere, the coma.

When solar wind ions fly through an atmosphere they are neutralized via charge exchange reactions with the neutral gaseous species. These reactions depend strongly on target species and collision velocity, and the resulting X-rays are a strong diagnostic of local solar wind conditions and of bulk properties of the cometary gas.

Since the first discovery of cometary X-rays and extreme UV emission in 1996 came as a big surprise, almost twenty comets have been studied with various instruments, including EUVE, ROSAT, Chandra, XMM, Suzuku, and Swift. This has resulted in a broad observational sample of different comets in entirely different solar wind environments, providing a unique method to remotely study the interaction between comets and the solar wind.