SMILE (Solar wind Magnetosphere Ionosphere Link Explorer) is a novel self-standing mission dedicated to observing the solar wind-magnetosphere coupling via simultaneous X-ray imaging of the magnetosheath and polar cusps (large spatial scales at the magnetopause), UV imaging of global auroral distributions (mesoscale structures in the ionosphere) and in-situ solar wind/magnetosheath plasma and magnetic field measurements. X-ray imaging of the magnetosheath and cusps is made possible by the X-ray emission produced in the process of solar wind charge exchange, first observed at comets, and subsequently found to occur in the vicinity of the Earth's magnetosphere. One of the science aims of SMILE is to track the substorm cycle, via X-ray imaging on the dayside and by following its consequences on the nightside with UV imaging.

SMILE is a collaborative mission between ESA and the Chinese Academy of Sciences (CAS) that was selected in November 2015, adopted into ESA's Cosmic Vision Programme in March 2019, and is due for launch at the end of 2023. The science that SMILE will deliver, as well as the ongoing technical developments and scientific preparations, and the current status of the mission, will be presented.
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