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# Emirates Mars Ultraviolet Spectrometer (EMUS) Overview from the Emirates Mars Mission

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The Emirates Mars Ultraviolet Spectrometer (EMUS) instrument is one of three science instruments to be carried on board the Emirate Mars Mission (EMM), the “Hope Probe”. EMM is a United Arab Emirates’ (UAE) mission to Mars launching in 2020 to explore the dynamics in the Martian atmosphere globally, while sampling on both diurnal and seasonal timescales. The EMUS instrument is a far-ultraviolet imaging spectrograph that measures emissions in the spectral range 100-170 nm. Using spacecraft motion, it will build up two-dimensional far-ultraviolet images of the Martian disk and near-space environment at several important wavelengths: Lyman beta atomic hydrogen emission (102.6 nm), Lyman alpha atomic hydrogen emission (121.6 nm), atomic oxygen emission (130.4 nm and 135.6 nm), and carbon monoxide fourth positive group band emission (140 nm-170 nm). Radiances at these wavelengths will be used to derive the column abundance of atomic oxygen, and carbon monoxide in the Martian thermosphere, and the density of atomic oxygen and atomic hydrogen in the Martian exosphere both with spatial and sub-seasonal variability. EMUS consists of a single telescope mirror feeding a Rowland circle imaging spectrograph capable of selectable spectral resolution (1.3 nm, 1.8 nm, or 5 nm) with a photon-counting and locating detector (provided by the Space Sciences Laboratory at the University of California, Berkeley). The EMUS spatial resolution of less than 300km on the disk is sufficient to characterize spatial variability in the Martian thermosphere (100-200 km altitude) and exosphere (>200 km altitude). The instrument is jointly developed by the Laboratory for Atmospheric and Space Physics (LASP) at the University of Colorado Boulder and Mohammed Bin Rashid Space Centre (MBRSC) in Dubai, UAE