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ELMO: ELection Microburst Observatory mission to study microbursts

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We describe the ELection Microburst Observatory mission, ELMO which is proposed as a CubeSat constellation mission to fully characterize microburst event spatial extent systematically for the first time both in latitude and longitude. ELMO comprises 4 CubeSats two per orbit plane in two orbit planes. ELMO will fly in a high inclination LEO at about 500 km in altitude. The CubeSats will systematically separate both in latitude and longitude over the mission lifetime and will carry MERIT, Miniaturized Electron and Proton Telescope as the the payload. MERIT has been built, tested and delivered to fly on NASA's HERMES, Lunar Gateway mission. MERIT is a solid state detector particle telescope with two identical sensor heads pointed zenith- and nadir-wards enabling measurement of both downgoing and upwelling electrons thereby accurately estimating electron precipitation into the atmosphere. MERIT will measure electron and protons over a wide energy range in multiple differential channels with a very time resolution of less than 4 ms.

ELMO will quantify for the first time the contribution of microbursts to radiation belt electron loss using systematic coordinated multipoint measurements. Energetic electron precipitation affects atmospheric chemistry and therefore climate change. ELMO measures microbursts with unprecedented time and energy resolution. ELMO provides critical knowledge of electron loss processes required for quantitative prediction of global electron fluxes.