

The SCOPE mission

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In order to open the new horizon of research in the Plasma Universe via in-situ measurements in the Earth magnetosphere, SCOPE will perform formation flying observations combined with high-time resolution electron detection. The simultaneous multi-scale observations by SCOPE of various plasma dynamical phenomena will enable data-based study of the key space plasma processes from the cross-scale coupling point of view. Key physical processes to be studied are magnetic reconnection under various boundary conditions, shocks in space plasma, collisionless plasma mixing at the boundaries, and physics of current sheets embedded in complex magnetic geometries. The SCOPE mission is made up of the 5 spacecraft formation put into the equatorial orbit with the apogee at 30Re (Re: earth radius). One of the spacecraft is a large mother ship which is equipped with a full suite of particle detectors including ultra-high sampling electron detector. Among other 4 small spacecraft, one remains near (~10km) the mother ship and the spacecraft-pair will focus on the issue of wave-particle interaction utilizing inter-s/c communication. Others at the distance of 100~3000km (electron ~ion spatial scales) from the mother ship will monitor plasma dynamics surrounding the mother-daughter pair. There is lively on-going discussion on Japan-Europe international collaboration (CrossScale), which would certainly make better the coverage over the scales of interest and thus make the success of the mission, i.e., clarifying the multi-scale nature of the Plasma Universe, to be attained at an even higher level.