



## **The Alfvén Mission for the ESA M5 Call: Mission Concept**

Andrew Fazakerley (1), Matthieu Berthomier (2), Raymond Pottelette (2), and Colin Forsyth (1)

(1) University College London, Mullard Space Science Laboratory, Space and Climate Physics, Dorking, United Kingdom, (2) Laboratoire de Physique des Plasmas, Paris, France

This poster will present the proposed Alfvén mission concept and is complemented by a presentation of the mission scientific goals planned for the ST1.5 session. The Alfvén mission has the scientific objective of studying particle acceleration and other forms of electromagnetic energy conversion in a collisionless low beta plasma. The mission is proposed to operate in the Earth's Auroral Acceleration Region (AAR), the most accessible laboratory for investigating plasmas at an interface where ideal magneto-hydrodynamics does not apply. Alfvén is designed to answer questions about where and how the particles that create the aurorae are accelerated, how and why they emit auroral kilometric radiation, what creates and maintains large scale electric fields aligned with the magnetic field, and to elucidate the ion outflow processes which are slowly removing the Earth's atmosphere. The mission will provide the required coordinated two-spacecraft observations within the AAR several times a day. From well designed separations along or across the magnetic field lines, using a comprehensive suite of inter-calibrated particles and field instruments, it will measure the parallel electric fields, variations in particle flux, and wave energy that will answer open questions on energy conversion. It will use onboard auroral imagers to determine how this energy conversion occurs in the regional context and, together with its orbit design, this makes the mission ideally suited to resolving spatio-temporal ambiguities that have plagued previous auroral satellite studies. The spacecraft observations will be complemented by coordinated observations with the existing dense network of ground based observatories, for more detailed ionospheric and auroral information when Alfvén overflights occur.