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Nitrogen Ion TRacing Observatory (NITRO) ESA's M-class call

Masatoshi Yamauchi (1), Iannis Dandouras (2), Peter Rathsman (3), and the The NITRO Proposal Team

(1) Swedish Institude of Space Physics (IRF), Kiruna, Sweden (m.yamauchi@irf.se), (2) Institut de Recherche en Astrophysique et Planetologie (IRAP), CNRS/Universite de Toulouse, Toulouse, France (Iannis.Dandouras@irap.omp.eu), (3) OHB-Sweden, Kista, Sweden

Nitrogen (N) dynamics in the magnetosphere has not been thoroughly investigated in the past due to the difficulty in separating from the oxygen (O). The NITRO mission that was proposed for the recent ESA's M-class mission call in January 2015 studies the budget and dynamics of magnetospheric nitrogen ions (N^+ and N_2^+) by separating them from O^+ in the inner magnetosphere using 2 orbiting spacecraft. One spacecraft is spin stabilized (spin period of 22-26 sec) at an 800 km$\times$33000 km altitude orbit (apogee about 6 RE geocentric distance) with 68.5° inclination for in situ plasma measurement of ions in the magnetosphere. The other spacecraft is 3-axis stabilized at a 500 km$\times$2400 km altitude orbit with 88.35° inclination for optical measurement of line-of-sight integrated emissions from the magnetospheric plasma and monitoring of plasma conditions just above the ionosphere and the exosphere between 1500km-2500km. With these two spacecraft with the same longitudinal drift velocity, the mission will shed light on major questions on six different disciplines related to ESA's Cosmic Vision themes CV1.3 and CV2.1 multi-disciplinary objectives:
Ancient Earth (Amino acid formation depends on relative abundance of atmospheric N, O, & H).
Planetary Evolution (why N/O ratio on Mars is only 0.1% of Earth, Venus, or Titan).
Exospheric Morphology (no direct measurement of exosphere above 1500 km and limited UV measurement only for hydrogen and oxygen).
Ionospheric Physics (ionization at the topside ionosphere at different external conditions determines ion escape and ionosphere-exosphere-magnetosphere coupling).
Magnetospheric Dynamics (ion dynamics and circulation of ionospheric origin and the dependency of N-O-H ratio on solar and solar wind conditions are not well understood).
Space Plasma Physics (Different V0 between M/q=14 and M/q=16 gives extra information on energization mechanisms in space).
The detail of the proposal will be presented in the General Assembly.