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Validation and characterisation of the Sweeping Langmuir Probe (SLP) instrument for the PICASSO mission

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The Sweeping Langmuir Probe (SLP) instrument, that uses a novel measurement technique to take into account spacecraft charging effects, has been developed at the Royal Belgian Institute for Space Aeronomy. SLP will fly on board the ESA scientific in-orbit demonstrator PICASSO together with the hyper-spectral imager VISION. PICASSO, a triple unit CubeSat, will be launched in March 2020. The goal of the mission is to prove the feasibility of performing true science (with limited extent) with a nano-satellite and demonstrate the very low cost / science ratio with respect to big missions. SLP will allow a global monitoring of the ionosphere with a maximum spatial resolution of the order of 150 m. The main goals are to study the ionosphere-plasmasphere coupling, the subauroral ionosphere and corresponding magnetospheric features together with auroral structures and polar caps, by combining SLP data with other complementary data sources (space- or ground-based instruments). SLP can measure plasma density from $1\text{e}8/\text{m}^3$ up to $1\text{e}13/\text{m}^3$ and electron temperature up to 15 000 K.

We will present the main results from the validation tests performed in the plasma chamber at ESTEC together with comparisons with particle-in-cell (PIC) simulations performed with SPIS (Spacecraft Plasma Interaction System).