

Boom accomodation effects on plasma and field measurements with RPWI

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Abstract

While the JUICE spacecraft configuration and main contractor are yet to be decided, it is still possible to investigate general issues on the impact of various boom accomodation alternatives for measurements of plasma and electric fields using the Langmuir probe system of the Radio and Plasma Waves Investigation. These probes can be used as classical Langmuir probes, as electric field probes, or for mutual impedance measurements, and the impact of e.g. varying illumination and wake interference are different for each type of measurement. While there is a nominal JUICE trajectory for the main science mission, we have to do assumptions on the spacecraft pointing, e.g. nadir pointing during flybys of the various moons. The detailed spacecraft layout is not known, but we can arrive at general conclusions on the suitability of various boom accomodations by assuming a cube-like spacecraft with solar panels as rectangular wings. For disturbing structures like wakes and photoelectron clouds we use simple models based on previous simulations. Even though the detailed pointing and spacecraft design will quite certainly deviate from our assumptions, and the model has uncertainties also in other respects, we can still give some general conclusions on boom accomodation alternatives