



New aspects of the RPW instrument antennas aboard Solar Orbiter

Manfred Sampl (1), Michael Kapper (1), Dirk Plettemeier (2), Helmut O. Rucker (1), and Milan Maksimovic (3)

(1) Austrian Academy of Sciences, Space Research Institute, Graz, Austria (manfred.sampl@oeaw.ac.at), (2) TU-Dresden, Chair for RF Engineering, Dresden, Germany, (3) LESIA, Observatoire de Paris, France

The E-field sensors (boom antennas) of the RPW instrument aboard the Solar Orbiter spacecraft are subject to severe influence of the conducting spacecraft body and other large structures such as the solar panels in close vicinity of the antennas.

In this contribution we outline our newest results in finding the true properties of the antennas with additional emphasis on the influence of the built-in heating circuit for deployment. Knowledge of the true properties of the connected antenna system and receiver hardware is an essential component in ensuring the overall performance of a scientific radio and plasma wave instrument. Compared to other spaceborne multiport scatterers, the ANT sensors aboard Solar Orbiter are more sophisticated in mechanical design with features including tubular shaped pipes with radiators along with several hinges. This combined with the challenging environment (closest proximity to Sun is about 0.29 AU) makes finding the true properties even more pressing than with previous spaceborne radio astronomy observatories. Our numerical investigations also provide an important benchmark against measured antenna characteristics using a scale model of the Solar Orbiter spacecraft in an anechoic chamber.

The current calibration results are to provide useful input to goniopolarimetry techniques like polarization analysis, direction finding and ray tracing, all of which depend crucially on the effective axes, allowing for significant improvements to the corresponding scientific data analysis.