

## Imaging the inner structure of a scaled model of the comet 67P/TG

In November 2014, the Rosetta mission of the European Space Agency's met with Comet 67P/Churyumov-Gerasimenko. One instrument of this mission is the CONSERT experiment. The CONSERT experiment has explored the nucleus of this comet using electromagnetic waves in the radiowave regime exploiting a bistatic configuration. One of its scientific aims is to contribute to a better understanding of the composition of the cometary core and of its internal structure. The first measurements with CONSERT were made immediately after the landing of the lander Philae on the comet and have already shown the ability of such electromagnetic techniques to explore the comets. As the physical features of an unknown target are contained in its scattered field, it is possible – in theory - to retrieve its structural and electromagnetic characteristics thanks to the resolution of an inverse scattering problem. For this specific issue, the main difficulties are due to the large size of the comet and to the small number of available measurements.

In this internship, the student will adapt (existing) imaging procedures to be able to get information on the inner structure of the comet. In particular, she/he works on the mixture of the temporal and the spatial tomography approaches with quantitative imaging methods (allowing to reconstruct the permittivity of the structure). As modelling the propagation of the electromagnetic signal through such large bodies is not trivial, the trainee will also work with “experimental simulation” on a comet analog to study the interaction of electromagnetic microwaves with this analog, in a perfectly controlled lab-environment.

**Mots Clefs :** Comet analog - Electromagnetic scattering - Imaging - Small solar bodies - Microwave - Polarisation

**Profil du candidat :** The applicant must have good knowledge in physics and in particular in electromagnetism. Skills in the microwave regime specificities and in hyperfrequency electronics will be appreciated.

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### Références :

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