



Short Visit Grant

Scientific Report

Scientific report (one single document in WORD or PDF file) should be submitted online within one month of the event. It should not exceed eight A4 pages.

Proposal Title: Exploring the origin and evolution of Terrestrial planet Trojan asteroids with Gaia

Application Reference N°: 6231

1) Purpose of the visit

The purpose of my short visit to OCA in Nice was to explore ways in which data from the Gaia mission can be used to characterise better the population of coorbital asteroids of Earth and Mars, with particular emphasis on Martian Trojans that I have worked on recently (Christou, 2013, Icarus, 224, 144).

2) Description of the work carried out during the visit

The visit began by my informing the OCA group of the latest results on Martian Trojans and the new scientific problems that they pose through a seminar-level talk. This was followed by detailed discussions with Dr Paolo Tanga regarding the capabilities of Gaia, the ground-based segment of the mission and the schedule for data release. In addition, I had the opportunity to talk with the resident experts on aspects of our mutual research relevant to Martian Trojans.

3) Description of the main results obtained

As the main result of the visit, we now know that many types of Gaia data will provide unique new information to test models of Martian Trojan origin and their continuing evolution. Specifically, Gaia's angular resolution is sufficient to resolve binary Martian Trojans, either directly or through

the centre-of-mass motion of the primary. Gaia spectra and lightcurves will tell us a great deal about the shapes, sizes, rotational states and compositions of these objects. Furthermore, given Gaia' scanning law across the sky, we expect these objects to be re-observed tens of times over the course of the nominal mission.

4) Future collaboration with host institution (if applicable)

I believe that further collaboration with Dr Tanga and the OCA group in general will put me in the best possible position to exploit these data for my research when they become available. I will use future visits to OCA to familiarise myself with Gaia data formats and the tools that are available in-house (b) write my own code where necessary to interpret the observations (c) interact with OCA experts to understand what the results will tell us about major questions in asteroid physical evolution and the origin of the terrestrial planets.

5) Projected publications / articles resulting or to result from the grant (*ESF must be acknowledged in publications resulting from the grantee's work in relation with the grant*)

Although the purpose of this short visit was exploratory, I feel it has opened opportunities for collaboration with OCA that will eventually result in joint publications.

6) Other comments (if any)

I would like to thank the European Science Foundation for making it possible for me to visit one of the leading institutes for small body research through this grant.