



## FINAL STARDUST CONFERENCE SYMPOSIUM PROPOSAL

**Title of the Symposium: Resonances and chaos in Earth's orbit**

Mini-Symposium on Resonances and chaos in Earth's orbit at the Stardust Final Conference on Asteroids and Space Debris. The mini-symposium will be held on a single session on 2nd November, 2016.

Brief description and list of topics covered by each session:

From a physical point of view, the low-orbiting Earth debris population is similar to the asteroid belt, since it is subject to a process of high-velocity mutual collisions that affects the long-term evolution of its size distribution. The similarity can be extended also to the dynamics affecting the motion of the objects in the two contexts. The asteroid belt is sculpted by mean motion and secular resonances, and the overlapping of resonances is ultimately responsible for the chaotic motion leading small objects to cross the orbits of the terrestrial planets. As a matter of fact, our knowledge of such phenomena in celestial mechanics comes mainly from studies on asteroid dynamics. Nonetheless, with the growing risk posed by the proliferation of space debris similar problems became of interest also for the case of the Earth orbits. The interplay of different perturbations in the Earth vicinity, from the Earth gravity field to the complex motion of the Earth–Moon–Sun system, along with the tiny but non negligible effects of non-gravitational perturbations, are responsible for a rich dynamical environment where resonances and chaos are now recognised as major players.

Topics to be covered by Mini-Symposium:

- Resonances and chaos in the Earth vicinity
- Medium Earth Orbit region - the home of the Global Navigation Satellites Systems
- Theoretical exploration of the resonances in the Earth orbit and their practical implications for mission planning
- Space debris environment as a whole

Exposition area:

An exposition area, next to the conference rooms, will be made available to interested industries, as well as research groups, to showcase their products and boost knowledge exchange activities. For info on space availability and costs contact the conference organizers at [stardust@strath.ac.uk](mailto:stardust@strath.ac.uk).

Important dates:

- 31st July 2016: Paper submissions
- 31st Oct – 4th Nov 2016: The Final Stardust Conference
- 2nd Nov 2016: Mini-Symposium on Resonances & Chaos in Earth's orbit

Virtual attendance:

Given the global nature of the asteroid and debris threat, institutions outside Europe can join in virtually through internet media. Please contact the organizers at [stardust@strath.ac.uk](mailto:stardust@strath.ac.uk) regarding the availability and functionality of this arrangement.

#### Proceedings:

Accepted papers will be included in a book of proceedings to be published after the conference. Moreover, we are negotiating journal special issues to publish a selected set of paper. Note that in this case the papers will be subject to the usual revision process, and thus publication is not guaranteed.

#### Registration:

- All conference attendees must register and pay the corresponding registration fee.
- For each accepted paper at least one registration as presenting author is required.
- The presenting author must register to ensure the inclusion of the paper in the Proceedings.
- Details on the registration, including costs and deadlines, will be available soon.

#### Info and Contacts:

Updated information can be found on Stardust website.

The organisers can be reached at [stardust@strath.ac.uk](mailto:stardust@strath.ac.uk)

#### Symposium organizers:

Alessandra Celletti, Giuseppe Pucacco (UTV)

Alessandro Rossi (CNR)

#### Conference organizers:

Massimiliano Vasile, Edmondo Minisci, Peter McGinty (University of Strathclyde), Leopold Summerer (ESA-ESTEC)

#### Invited Speakers:

- Catalin Gales (keynote speaker)
- Christos Efthymiopoulos
- Christoph Lhotka
- Anne Lemaitre