

Inter-Division A-F Commission A4 “Celestial Mechanics and Dynamical Astronomy”

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The IAU Inter-Division A-F Commission A4 “Celestial Mechanics and Dynamical Astronomy” presently unites 202 members. The main goal of the commission is to co-ordinate and support the activities of IAU members working in these two broad fields. These activities include: treatments of the mathematical, physical and computational aspects of planetary theory, perturbation theory, resonance models, chaos and diffusion, stability criteria, orbital and space mechanics, ring systems, tidal models, galactic dynamics, non-gravitational forces, and computer languages for analytical developments.

1. The **IAU Symposium 364 on "Multi-Scale (Time and Mass) Dynamics of Space Objects"** was held in dual form in Iasi, Romania, from October 18 to 22, 2021. The Symposium was proposed by the previous organizing committee (2018-2021) in 2019, but it was postponed due to the COVID events. The symposium was a major event which gathered together about 200 participants, out of whom 98 speakers (20 invited) in the following topics: Large-scale body dynamics: planets and exoplanets, medium-scale body dynamics: asteroids, comets, NEOs, natural satellites, perturbation methods and long-term evolution of space objects, exploration and exploitation of space objects, small-scale body dynamics: dust particles, rings and space debris & numerical and analytical methods for resonances and chaos. Most contributions are included in the corresponding IAU volume of proceedings (A. Celletti (co-chair), C. Gałę (co-chair), C. Beaugé, and A. Lemaitre (eds), Cambridge University Press). More information about the content of the Symposium can be found at the symposium's webpage: https://www.math.uaic.ro/~IAU_S364/.

2. One of the main goals of the IAU Commission A4 (see https://www.iau.org/science/scientific_bodies/commissions/A4/) is to "promote the periodic holding of a Summer School aiming to train young researchers on the most important current topics in Celestial Mechanics and Dynamical Astronomy. Such schools can take place before major scientific meetings, such as the celebrated CELMEC conferences."

This year, the **Advanced Study School on "Celestial Mechanics -Theory and Applications"** (CELTA ASI) 2022 will be held from 15 to 27 August 2022 at Inverness & Skye, Scotland. The school is under the patronage of the IAU Commission A4, and it will include lectures by 16 Invited Speakers. The school is organized jointly with the 77th Scottish Universities Summer School in Physics, under the direction of Prof. Bonnie Steves (Glasgow Caledonian University). The school will precede the **Eighth International Meeting on Celestial Mechanics (CELMEC VIII)** which will take place at the University of Rome Tor Vergata during the period 5-9 September 2022 (Organizing/Scientific committee: A. Celletti, G.F. Gronchi, C. Lhotka, U. Locatelli, G. Pinzari, S.

Terracini). The format will be hybrid, and there will be 203 participants (including 24 invited talks). CELMEC has reached an agreement with the international journal "Celestial Mechanics and Dynamical Astronomy", to allow the publication of original papers presented at the meeting. The papers will be organised in two Topical Collections, under the titles: a. Innovative computational methods in Dynamical Astronomy, and b. Variational and perturbative methods in Celestial Mechanics.

3. The past-president of the A4 organising committee (A. Celletti) is chief editor of the journal Celestial Mechanics and Dynamical Astronomy, and many members of our commission participate in the editorial board (see <https://www.springer.com/journal/10569/editors>). Besides regular articles, the journal publishes topical collections which provide a continuous update on the most important advances in celestial mechanics, astrodynamics and space mechanics, as well as broader topics within the field of dynamical astronomy. In the period 2021-2022, the following topical collections were published by the journal:

- Dynamics of Space Debris and NEO
Xiyun Hou, Massimiliano Vasile and Alessandra Celletti (eds)
- Exoplanet Dynamics
Alessandro Morbidelli, Kleomenis Tsiganis and Alessandra Celletti (eds)