

## Preface

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Advances in European Solar Physics

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The 13th triennial European Solar Physics Meeting (ESPM-13) took place in the island of Rhodes, Greece, in September 2011. ESPMs were formerly organised by the Solar Physics Section of the European Physical Society (EPS). ESPM-13, however, marked the first meeting to be organised by the newly established European Solar Physics Division (ESPD)<sup>1</sup> of the EPS. The one-week conference featured more than 80 original invited and contributed talks and was complemented by more than 160 poster presentations. Overall, the meeting attracted more than 200 participants from more than 30 countries worldwide, a fact that unequivocally attests to the high international standing and scientific

leadership of the European solar research community.

The Conference Programme consisted of nine thematic sessions, which covered the entire spectrum of contemporary solar and inner-heliospheric physics. The themes of these sessions were as follows.

- Science with cutting-edge heliospheric missions.
- Science with future heliospheric missions and telescopes.
- The Sun as a whole: large-scale flows, helioseismology, magnetism, and the solar cycle.
- Emergence and evolution of magnetic flux in the solar atmosphere.
- Chromospheric and coronal heating.
- Transient activity and seismology in the solar atmosphere.
- Solar instabilities, flares, and coronal mass ejections.
- Origin and properties of the solar wind.
- Solar data assimilation and space weather research.

In view of the meeting's impressive breadth of new scientific results and analyses relying on the latest solar and heliospheric data, the Scientific Organizing Committee strived to encapsulate the meeting's deliberations into a fully peer-reviewed two-volume Topical Issue (TI) in *Solar Physics*. The community's response was immediate and substantial, resulting in several tens of original works submitted in the framework of the TI. These manuscripts discuss the breakthrough knowledge afforded by the armada of new solar-observing space missions, namely *Hinode*, STEREO, RHESSI, PROBA-2, and SDO. Emphasis is also given to the SUNRISE solar-observing balloon-borne mission, as well as to a new generation of ground-based observing facilities, such as the *Swedish Solar Telescope* and the German *Vacuum Tower Telescope* on Tenerife. In addition, future space- and ground-based instrumentation, such as the *Solar Orbiter* mission, *Solar-C*, *Solar Particle Acceleration*, *Radiation*,

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<sup>1</sup>See <http://solar.epsdivisions.org>.

and Kinetics (SPARK), the *Siberian Solar Radio Telescope* (SSRT), the *Low-Frequency Array* (LOFAR), the *Advanced Technology Solar Telescope* (ATST), and the *European Solar Telescope* (EST) are subjects of thorough discussion. Last but not least, capital emphasis is given to theoretical and modelling advances achieved by state-of-the-art magnetohydrodynamic (MHD) and particle-in-cell (PIC) numerical simulations, complemented by supporting analytical and numerical modeling.

A take-away message of ESPM-13, captured in the contents of this TI, lies in the critical contributions of young, brilliant and enthusiastic researchers who, early in their career, stood before an expert audience to deliver outstanding presentations, including invited reviews. This can only add to our firm belief that the future of solar physics in Europe is, indeed, bright.

The ESPM-13 meeting program, including full texts of most of the invited and contributed presentations, can be downloaded from <http://astro.academyofathens.gr/espm13/program.html>

The Guest Editors of this TI wish to take this opportunity to express the ESPD's sincere gratitude to the ESPM-13 sponsors for decisively contributing to the success of the meeting. These sponsors include the Academy of Athens, the National Observatory of Athens, the European Space Agency (ESA) via the *Solar and Heliospheric Observatory* (SOHO), the European Association of Solar Telescopes (EAST), the European Physical Society (EPS), the Solar-Terrestrial Investigation and Archives (SOTERIA) consortium, and the Piraeus Bank. In addition, we thank all the authors and referees of the TI papers for their substantial efforts – it is only through these efforts that the TI has actually materialized. Special thanks and acknowledgments are also in order for *Solar Physics* and its Editorial Board, who so kindly accepted this major undertaking and the production of the TI. Finally, we thank in advance the numerous and diverse readers of this TI, to whom we sincerely wish an enjoyable and revealing reading.