Solar Phys (2015) 290:3379–3381
DOI 10.1007/s11207-015-0818-5

Preface

L. Fletcher[1] · P. Heinzel[2] · L. van Driel-Gesztelyi[3,4,5] · C.H. Mandrini[6,7] · F. Fárník[2]

Published online: 24 November 2015

Solar flares and flares on other cool stars are currently extensively studied using new ground- and space-based instruments, together with highly sophisticated numerical simulations. This was reflected well in the many contributions to the conference "Solar and Stellar Flares: Observations, simulations and synergies", held in Prague during 23 – 27 June 2014, from which this Topical Issue (TI) is drawn. The conference was organised in honour and memory of Prof. Zdeněk Švestka (1925 Prague – 2013 Bunschoten), a leading expert in the field of solar flares and the co-founder and editor in chief of the journal *Solar Physics* (see his memoirs,

Solar and Stellar Flares: Observations, Simulations, and Synergies
Guest Editors: Lyndsay Fletcher and Petr Heinzel

✉ L. Fletcher
lyndsay.fletcher@glasgow.ac.uk

P. Heinzel
pheinzel@asu.cas.cz

L. van Driel-Gesztelyi
Lidia.vanDriel@obspm.fr

C.H. Mandrini
mandrini@iafe.uba.ar

F. Fárník
frantisek.farnik@asu.cas.cz

1 SUPA School of Physics and Astronomy, University of Glasgow, Glasgow G12 8QQ, UK

2 Astronomical Institute, The Czech Academy of Sciences, 251 65 Ondřejov, Czech Republic

3 Mullard Space Science Laboratory, University College London, Holmbury St Mary, Dorking, Surrey RH5 6NT, UK

4 Observatoire de Paris, LESIA-CNRS UMR 8109, 9295 Meudon Cédex, France

5 Konkoly Observatory of Hungarian Academy of Sciences, Budapest, Hungary

6 Instituto de Astronomía y Física del Espacio, CONICET-UBA, Buenos Aires, Argentina

7 Facultad de Ciencias Exactas y Naturales (FCEN), UBA, Buenos Aires, Argentina

Švestka, 2010, and obituary in the June 2013 issue of the journal). Almost 100 participants came to Prague from all over the world to attend the meeting, and they presented many new interesting results on flares. This TI represents a selection of articles (both reviews and original research papers) based on presentations at the meeting. The Prague conference was held 25 years after a similar TI was published in *Solar Physics*, collecting papers presented during IAU Colloquium 104 on solar and stellar flares (Haisch and Rodono, 1989). At that meeting, Zdeněk Švestka presented an invited review on the gradual phase of solar flares (Švestka, 1989).

This TI starts with Hugh Hudson's reminiscences on Zdeněk Švestka's research, coupled with current achievements, problems, and perspectives (Hudson, 2015), followed by four reviews based on invited talks. Janvier, Aulanier, and Démoulin (2015) give an overview of coronal observations and magnetohydrodynamic (MHD) simulations, the building blocks for 3D models of solar flares. Flare energetics is currently a hot topic (*e.g.* Milligan *et al.*, 2014; Kerr and Fletcher, 2014; Kleint *et al.*, 2015) that requires multiwavelength spectral observations, and Milligan (2015) reviews the extreme ultra-violet (EUV) spectroscopy of the lower solar atmosphere during flares, from which the properties of flare plasmas can be deduced, using observations from the *Extreme ultraviolet Variability Experiment* (EVE) experiment onboard the *Solar Dynamics Observatory* (Woods *et al.*, 2012) and the *Extreme ultraviolet Imaging Spectrometer* (EIS, Culhane *et al.*, 2007). In the optical range, broadband spectra of stellar flares are being obtained by large telescopes, and Kowalski *et al.* (2015) present comprehensive insights into the white-light flare emission from stellar flares. These data are hard to obtain, but are crucial also in the solar case. In particular, the authors analyse the strongly enhanced hydrogen Balmer continuum, which was always rather difficult to detect in solar flares (*e.g.* Švestka, 1966), but see the recent findings from the *Interface Region Imaging Spectrograph* (IRIS, De Pontieu *et al.*, 2014) near-ultraviolet (NUV) flare spectra by Heinzel and Kleint (2014). The article by Kowalski *et al.* (2015) also shows how the technique of numerical radiation hydrodynamics can be applied to both solar and stellar flare studies. Finally, the broad topic of the relation of flares and coronal mass ejections (CMEs) is covered by Schmieder, Aulanier, and Vršnak (2015). These four articles are then followed by ten contributed articles that cover a broad range of interesting and current topics. From among these, we highlight the exciting and new topic of "super flares" discussed during the conference, which also has implications for exoplanetary habitability (*e.g.* Katsova and Livshits, 2015).

The scientific organising committee (SOC) of the conference was co-chaired by P. Heinzel and L. Fletcher, with members B. Dennis, L. van Driel-Gesztelyi, F. Fárník, S.L. Hawley, H.S. Hudson, M. Karlický, E.R. Priest, K. Shibata, J. Sylwester, and A. Veronig. The local organising committee (LOC) was chaired by F. Fárník, with members P. Heinzel, J. Kašparová, M. Varady, and Z. Pecková. Since Z. Švestka was an honorary member of the Czech Learned Society, the conference was held under the auspices of this Society and was opened by its president, Professor J. Bičák. The main organising body was the Astronomical Institute of the Czech Academy of Sciences, together with CBT Prague. We would like to acknowledge that the conference was considered to be part of the activities of seven European research centres working within the EC-funded FP7 project "F-CHROMA" – Flare Chromospheres: Observations, Models and Archives. And last but not least, we also thank all of the referees for their helpfulness and careful attention in improving the quality of the articles in this volume.

We were delighted to dedicate this conference and now its related TI of *Solar Physics* to the memory of Zdeněk Švestka, our colleague and friend. We were also very happy to welcome his wife Lída to the meeting, remembering the early years at Ondřejov Observatory,

where she worked with Zdeněk on optical flare spectroscopy. We hope that Zdeněk would have enjoyed the meeting, and also leafing through its Topical Issue.

Acknowledgements Sponsorship of the conference by Springer is gratefully acknowledged.

References

Culhane, J.L., Harra, L.K., James, A.M., Al-Janabi, K., Bradley, L.J., Chaudry, R.A., *et al.*: 2007, *Solar Phys.* **243**, 19.
De Pontieu, B., Title, A.M., Lemen, J.R., Kushner, G.D., Akin, D.J., Allard, B., *et al.*: 2014, *Solar Phys.* **289**, 2733.
Haisch, B.M., Rodono, M.: 1989, *Solar Phys.* **121**, 1. DOI.
Heinzel, P., Kleint, L.: 2014, *Astrophys. J. Lett.* **794**, L23. DOI.
Hudson, H.S.: 2015, *Solar Phys.* this issue. DOI.
Janvier, M., Aulanier, G., Démoulin, P.: 2015, *Solar Phys.* this issue. DOI.
Katsova, M.M., Livshits, M.A.: 2015, *Solar Phys.* this issue. DOI.
Kerr, G.S., Fletcher, L.: 2014, *Astrophys. J.* **783**, 98. DOI.
Kleint, L., Heinzel, P., Judge, P., Krucker, S.: 2015, *Astrophys. J.* arXiv.
Kowalski, A.F., Hawley, S.L., Carlsson, M., Allred, J.C., Uitenbroek, H., Osten, R.A., Holman, G.: 2015, *Solar Phys.* this issue. DOI.
Milligan, R.O.: 2015, *Solar Phys.* this issue. DOI.
Milligan, R.O., Kerr, G.S., Dennis, B.R., Hudson, H.S., Fletcher, L., Allred, J.C., Chamberlin, P.C., Ireland, J., Mathioudakis, M., Keenan, F.P.: 2014, *Astrophys. J.* **793**, 70. DOI.
Schmieder, B., Aulanier, G., Vršnak, B.: 2015, *Solar Phys.* this issue. DOI.
Švestka, Z.: 1966, *Space Sci. Rev.* **5**, 388. DOI.
Švestka, Z.: 1989, *Solar Phys.* **121**, 399. DOI.
Švestka, Z.: 2010, *Solar Phys.* **267**, 235. DOI.
Woods, T.N., Eparvier, F.G., Hock, R., Jones, A.R., Woodraska, D., Judge, D., Didkovsky, L., *et al.*: 2012, *Solar Phys.* **275**, 115. DOI.