



---

**Title:** WORKSHOP ON THE GOLDEN AGE OF CATAclysmic VARIABLES AND RELATED OBJECTS – II.

**Editors:**

Franco Giovannelli, INAF - Istituto di Astrofisica e Planetologia Spaziali, Area di Ricerca di Tor Vergata, Roma, Italy

Lola Sabau-Graziati, INTA - Dpt. Cargas Útiles y Ciencias del Espacio, Madrid, Spain

**Co-published by:** Czech Technical University in Prague (CTU), Žitná 4, 166 36 Prague 6, Czech Republic, and Astronomical Institute of the Czech Academy of Sciences, Fričova 298, 251 65 Ondřejov, Czech Republic.

**Editorial Office:** CTU — Central Library,  
Technická 6, 160 80 Praha 6, Czech Republic.  
acta@cvut.cz

**IČ:** 68407700.

**Head of the Editorial Board:** V. Petráček.

**Editorial Board — internal members:**

Robin Arthur Healey, Rectorate of CTU, Department of External Affairs, CTU, Czech Republic

Taťána Jarošíková, Faculty of Biomedical Engineering, Department of Natural Sciences, CTU, Czech Republic

Milan Jirásek, Faculty of Civil Engineering, Department of Mechanics, CTU, Czech Republic

Jitka Jírová, Faculty of Transportation Sciences, Department of Mechanics and Materials, CTU, Czech Republic

Petr Jizba, Faculty of Nuclear Sciences and Physical Engineering, Department of Physics, CTU, Czech Republic

Pavel Kalina, Faculty of Architecture, Department of Theory and History of Architecture, CTU, Czech Republic

Zuzana Masáková, Faculty of Nuclear Sciences and Physical Engineering, Department of Mathematics, CTU, Czech Republic

Jan Píchal, Faculty of Electrical Engineering, Department of Physics, CTU

Miroslav Sýkora, Klokner Institute, Department of Structural Reliability, CTU, Czech Republic

Radek Šulc, CTU, Faculty of Mechanical Engineering, Department of Process Engineering, CTU, Czech Republic

**Editor-in-chief:** I. Adlerová.

**Graphic design and typesetting:** V. Nežerka, M. Somr.      **Cover:** M. Růžičková, J. Jílek.

**Print:** CTU Publishing House, Žitná 4, 166 36 Prague 6, Czech Republic. [Date of issue] April 20, 2015

In: Acta Polytechnica CTU Proceedings(2),1, <http://ojs.cvut.cz/ojs/index.php/APP>

ISBN 978-80-01-05688-2 (ČVUT v Praze)

ISBN 978-80-905129-3-1 (Astronomický ústav AV ČR, v.v.i.)

ISSN 2336-5382

The publication of these proceedings was financially supported by the Czech Academy of Sciences.

© Czech Technical University in Prague and Astronomical Institute of the Czech Academy of Sciences, 2015.

Reprinting is allowed only with the agreement of the Editorial Office and with citation of the source.

**PALERMO WORKSHOP 2013**

*The Second International Workshop on*

**THE GOLDEN AGE OF CATAclysmic  
VARIABLES AND RELATED OBJECTS - II**

*Palermo, Italy, September 9 – 14*



Edited by

**Franco Giovannelli & Lola Sabau-Graziati**



**ASTRONOMICAL INSTITUTE**  
of the Academy of Sciences of the Czech Republic



INAF - OSSERVATORIO ASTRONOMICICO DI CAPODIMONTE

Technion  
Israel Institute of Technology  
Department of Physics



**CAEN**  
Tools for Discovery

## Organizing Institutions

INAF – Istituto di Astrofisica e Planetologia Spaziali, Roma – INAF-IAPS, Roma, Italy  
INTA – Dpt. de Cargas Útiles y Ciencias del Espacio, INTA-DCUCE, Madrid, Spain  
Czech Republic Academy of Sciences – Astronomical Institute, ASCR-AI, Ondřejov, Czech Republic  
Czech Technical University, CTU in Prague, Czech Republic  
Department of Physics, Technion, Haifa, Israel  
Russian Academy of Sciences – Institute of Astronomy, RAS-IA, Moscow, Russia  
INAF - Osservatorio Astronomico di Capodimonte, INAF-OAC, Napoli, Italy  
Department of Astronomy, University of Washington, Seattle, WA, USA

## Scientific Organizing Committee

Dmitry Bisikalo, RAS-IA, Moscow (Russia)  
Massimo Della Valle, INAF-OAC, Napoli (Italy)  
Franco Giovannelli, INAF-IAPS, Roma (Italy) (Chairperson)  
René Hudec, ASCR-AI., Ondřejov (Czech Republic)  
Lola Sabau-Graziati, INTA-DCUCE, Madrid (Spain)  
Giora Shaviv, Department of Physics, Technion, Haifa (Israel)  
Paula Szkody, Department of Astronomy, University of Washington, Seattle, WA, USA

## Local Organizing Committee

Franco Giovannelli, INAF-IAPS, Roma, Italy (Chairperson)  
Daniela Giovannini, CNR-IBCN, Roma, Italy  
Francesco Reale, CNR-ISC, Roma, Italy

## FOREWORD

New results coming from the new generation satellites, especially in the hard X-ray and  $\gamma$ -ray regions, renewed the interest of scientific community about CVs. This, together with the new developments in searching for the progenitors of type Ia Supernovae was the main reason for organizing this workshop on **The Golden Age of Cataclysmic Variables and Related Objects**.

After the great success attained with the first 2011 edition, we decided to organize, in agreement with the scientific community, this second meeting of a series with biennial cadence in Palermo in the beautiful Mondello bay.

We are completely convinced that a deep discussion about CVs and related objects, mostly through the physical processes occurring inside those systems, is the most powerful way for a better and faster development of our knowledge just of the cataclysmic processes, rather usual in the Universe.

For this purpose, we invited distinguished colleagues representative the most important space- and ground-based experiments of the present generation. They painted the whole panorama on the experimental results and on their interpretation by using current models and/or developing new ideas for a better comprehension of the detected phenomena. During the discussion of a lot of new results, obtained along most of the electromagnetic spectrum, we have learned that the astrophysics of galactic sources is still extremely interesting and unavoidable. Indeed it provides crucial information on the same physical processes occurring also in the extra-galactic sources, with obvious different scale factors.

Many thanks to the authors, which accepted our reminders recalled at the beginning of the workshop, for keeping to schedule. However, in spite of the accurate respect of the dead line of a number of authors, we still suffer a delay in publishing these proceedings because of the laziness of a considerable part of other authors. In spite of this, these proceedings will appear within one year from the workshop date.

This is the second edition of the workshop, whose proceedings are published by the ‘Acta Polytechnica CTU Proceedings’, an international refereed journal of the Czech Technical University in Prague (Czech Republic).

We would like to thank all participants and especially the speakers for their active contributions in rendering this workshop updated with their talks, alive with their discussions, and friendly with their attitudes. Particular thanks to Mr Francesco Reale for his excellent assistance for informatics in Roma, during the preparation of the workshop, and for his faultless assistance in Palermo.

A very special thank to Dr Daniela Giovannini for her precious help in managing the workshop.

We are grateful to the pianist Maestra Valentina Usai, to the violinist Maestro Alessandro Perpich and to the actresses Lisa Colosimo and Flavia Giovannelli for their wonderful performance “Hic Habitat Felicitas: Mozarterie from the Kingdom Behind” staged in the suggestive atmosphere of the Splendid La Torre Hotel.

Many thanks to:

- i. the director of the Istituto di Astrofisica e Planetologia Spaziali, Roma of the Istituto Nazionale di Astrofisica (IAPS-INAF) (Dr Pietro Ubertini);
- ii. the CAEN S.p.A. (Viareggio) who partially supported the organization of this workshop.

Particular thanks to the Plan Nacional de I+D+i of Spain for partially supporting the publication of this book.

Finally, we would like to thank Mr Daniele Inzerillo, the Chef of the Splendid La Torre Hotel, who delighted us with his creations during our stay and to the whole staff of the Hotel for their professionalism and kindness.

The Editors  
Franco Giovannelli & Lola Sabau-Graziati

# List of participants

**Arai Akira**, Nishi-Harima Astronomical Observatory, University of Hyogo, Japan  
arai@nhao.jp

**Balman Solen**, Middle East Technical University, Turkey  
solen@astroa.physics.metu.edu.tr

**Baptista Raymundo**, Universidade Federal de Santa Catarina (UFSC), Brazil  
raybap@gmail.com

**Bisikalo Dmitry**, Institute of Astronomy - RAS, Russia  
bisikalo@inasan.ru

**Blondin Stéphane**, Service d'Astrophysique, CEA Saclay, France  
stephane.blondin@oamp.fr

**Breytenbach Hannes**, University of Cape Town, South Africa  
johbenbrey@gmail.com

**Buckley David**, Southern African Large Telescope, South Africa  
dibnob@sao.ac.za

**Cannizzo John**, UMBC/NASA/GSFC, USA  
John.K.Cannizzo@nasa.gov

**Carter Philip**, Department of Physics, University of Warwick, UK  
philip.carter@warwick.ac.uk

**Chochol Drahomir**, Astronomical Institute of the Slovak Academy of Sciences, Slovakia  
chochol@ta3.sk

**De Bianchi Silvia**, TU Dortmund, Germany  
silvia.debianchi@tu-dortmund.de

**Della Valle Massimo**, Capodimonte Astronomical Observatory,  
INAF-Napoli & ICRANet, Pescara, Italy  
dellavalle@na.astro.it

**Ederoclite Alessandro**, Centro de Estudios de Física del Cosmos de Aragón, Spain  
aederocl@cefca.es

**Gilmozzi Roberto**, European Southern Observatory, Garching, Germany  
rgilmozz@eso.org

**Giovannelli Franco**, INAF – IAPS, Roma, Italy  
franco.giovannelli@iaps.inaf.it

**Gonzalez-Riestra Rosario**, XMM–Newton Science Operations Ctr, ESAC, Villafranca del Castillo, Villanueva de la Cañada, Madrid, Spain  
Rosario.Gonzalez@sciops.esa.int

**Hachisu Izumi**, University of Tokyo, Japan  
hachisu@ea.c.u-tokyo.ac.jp

**Henze Martin**, XMM–Newton Science Operations Ctr, ESAC, Villafranca del Castillo, Villanueva de la Cañada, Madrid, Spain  
martin.henze@sciops.esa.int

**Hernandez Santisteban Juan Venancio**, University of Southampton, UK  
j.v.hernandez@soton.ac.uk

**Hudec René**, Astronomical Institute AS–Ondřejov & CTU–Prague, Czech Republic  
rene.hudec@gmail.com

**Idan Irit**, Technion - Israel Institute of Technology, Israel  
idan@technion.ac.il

**Isern Jordi**, Institut for Space Sciences ICE-CSIC/IEEC, Barcelona, Spain  
isern@ieec.cat

**Ishida Manabu**, The Institute of Space and Astronautical Science/JAXA, Sagamihara, Japan  
ishida@astro.isas.jaxa.jp

**Izzo Luca**, Sapienza University of Rome and ICRANet, Roma, Italy  
luca.izzo@gmail.com

**Kajikawa Tomoyo**, Kyoto Sangyo University, Kyoto, Japan  
kajikawa@cc.kyoto-su.ac.jp

**Kato Mariko**, Keio University, Yokohama, Japan  
mariko@educ.cc.keio.ac.jp

**Katysheva Nataly**, Sternberg State Astronomical Institute, Moscow, Russia  
natkat2006@mail.ru

**Kawakita Hideyo**, Koyama Astronomical Observatory Kyoto, Sangyo University, Kyoto, Japan  
kawakthd@cc.kyoto-su.ac.jp

**Knigge Christian**, University of Southampton, UK  
C.Knigge@soton.ac.uk

**Kononov Dmitriy**, Institute of Astronomy - RAS, Moscow, Russia  
dkononov@inasan.ru

**Kotze Marissa**, South African Astronomical Observatory, Cape Town, South Africa  
marissa@sao.ac.za

**Kotze Enrico**, South African Astronomical Observatory, Cape Town, South Africa  
ejk@saaao.ac.za

**Latev Georgi**, Institute of Astronomy and National Astronomical Observatory, Sofia, Bulgaria  
glatev@astro.bas.bg

**Martino Bruno Luigi**, associated IAPS-INAF, Roma, Italy  
brunolmartino@gmail.com

**Mason Paul**, University of Texas at El Paso, USA  
pmason@nmsu.edu

**Meintjes Pieter**, University of the Free State, Bloemfontein, South Africa  
MeintjPJ@ufs.ac.za

**Mikolajewska Joanna**, N. Copernicus Astronomical Center–PAN, Warsaw, Poland  
mikolaj@camk.edu.pl

**Mukai Koji**, NASA/GSFC/CRESST and UMBC, Greenbelt, MD, USA  
Koji.Mukai@umbc.edu

**Nagashima Masayoshi**, Kyoto Sangyo University, Kyoto, Japan  
g0837714@gmail.com

**Naito Hiroyuki**, Nagoya University, Nagoya, Japan  
naito@phi.phys.nagoya-u.ac.jp

**Nebot Ada**, Observatoire Astronomique de Strasbourg, France  
ada.nebot@astro.unistra.fr

**Ness Jan-Uwe**, XMM–Newton Science Operations Ctr, ESAC, Villafranca del Castillo,  
Villanueva de la Cañada, Madrid, Spain  
juness@sciops.esa.int

**Neustroev Vitaly**, University of Oulu, Finland  
Vitaly.Neustroev@oulu.fi

**Odendaal Alida**, University of the Free State, Bloemfontein, South Africa  
WinkA@ufs.ac.za

**Orio Marina**, INAF–Osservatorio Astronomico di Padova, Italy  
marina.orio@oapd.inaf.it

**Pagnotta Ashley**, American Museum of Natural History, New York, NY, USA  
pagnotta@amnh.org

**Parisi Pietro**, INAF – IAPS, Roma, Italy  
pietro.parisi@iaps.inaf.it



**Patterson Joseph**, Columbia University, New York, NY, USA  
jop@astro.columbia.edu

**Poggiani Rosa**, Dipartimento di Fisica, Università di Pisa, Italy  
rosa.poggiani@df.unipi.it

**Potter Stephen**, South African Astronomical Observatory, Cape Town, South Africa  
sbp@sao.ac.za

**Pretorius Margaretha**, University of Southampton, UK  
m.pretorius@soton.ac.uk

**Qian Shengbang**, Yunnan Astronomical Observatory, Kunming, China  
qsb@ynao.ac.cn

**Reale Francesco**, Cnr – Isc, Italy  
francesco.reale@sic.rm.cnr.it

**Reinsch Klaus**, Universität Göttingen, Institut für Astrophysik, Germany  
reinsch@astro.physik.uni-goettingen.de

**Ritter Hans**, Max-Planck-Institut für Astrophysik, Germany  
hsr@mpa-garching.mpg.de

**Sabau-Graziati Lola**, Instituto Nacional de Técnica Aeroespacial (INTA) — Departamento de Cargas Útiles y Ciencias del Espacio (DCUCE), Torrejón de Ardoz, Madrid, Spain  
sabaumd@inta.es

**Scaringi Simone**, K.U. Leuven, The Netherlands  
simone.scaringi@ster.kuleuven.be

**Schmidtobreick Linda**, ESO, Santiago, Chile  
lschmidt@eso.org

**Schreiber Matthias R.**, Universidad de Valparaíso, Chile  
matthias.schreiber@uv.cl

**Sekeras Matej**, Astronomical Institute of Slovak Academy of Sciences, Tatranska Lomnica, Slovakia  
msekeras@ta3.sk

**Semena Andry**, Space Research Institute (IKI)–RAS, Moscow, Russia  
san@iki.rssi.ru

**Shaviv Giora**, Technion – Israel Institute of Technology, Haifa, Israel  
giora@shaviv.org

**Šimon Vojtěch**, Astronomical Institute, Academy of Sciences, Ondřejov, Czech Republic  
vojtech.simon@gmail.com

**Sion Edward**, Villanova University, PA - USA  
edward.sion@villanova.edu

**Skopal Augustin**, Astronomical Institute of Slovak Academy of Sciences, Tatranska Lomnica, Slovakia  
skopal@ta3.sk

**Smith Robert**, Department of Physics & Astronomy, University of Sussex, Brighton, UK  
r.c.smith@sussex.ac.uk

**Stoyanov Kiril**, Institute of Astronomy and National Astronomical Observatory, Sofia, Bulgaria  
kstoyanov@astro.bas.bg

**Suleimanov Valery**, Institute for Astronomy and Astrophysics, University of Tübingen, Germany  
suleimanov@astro.uni-tuebingen.de

**Szkody Paula**, University of Washington, WA, USA  
szkody@astro.washington.edu

**Tanabe Kenji**, Okayama University of Science, Okayama-shi, Japan  
tanabe@big.ous.ac.jp

**Tappert Claus**, Dpto de Física y Astronomía, Facultad de Ciencias, Universidad de Valparaíso, Chile  
claus.tappert@uv.cl

**Ubertini Pietro**, INAF – IAPS, Roma, Italy  
pietro.ubertini@iaps.inaf.it

**Uemura Makoto**, Hiroshima University, Higashi-Hiroshima, Japan  
uemuram@hiroshima-u.ac.jp

**Voloshina Irina**, Sternberg Astronomical Institute, Moscow State University, Moscow, Russia  
vib@sai.msu.ru

**Yuasa Takayuki**, JAXA, Sagami-hara, Japan  
yuasa@astro.isas.jaxa.jp

**Zemko Polina**, Sternberg Astronomical Institute, Moscow State University, Moscow, Russia  
polina.zemko@gmail.com

**Zharikov Sergey**, Instituto de Astronomía, UNAM, Ensenada, Mexico  
zhar@astrosen.unam.mx

**Zhu Liying**, Yunnan Astronomical Observatory, Kunming, China  
zhuly@ynao.ac.cn





# Palermo Workshop 2013 September 9-14

## S.O.C.

Dmitry Bisikalo - RAS/IA, Moscow  
Massimo Della Valle - INAF/OAC, Napoli  
Franco Giovannelli - INAF/IAPS, Roma (Chairperson)  
René Hudec - ASCR/AIO & CTU, Prague  
Lola Sabau-Graziati - INTA/DCUCE, Madrid  
Giora Shaviv - TECHNION/Dpt Physics, Haifa  
Paula Szkody - WA Un./Dpt Astronomy, Seattle

## L.O.C.

Franco Giovannelli - INAF/IAPS, Roma (Chairperson)  
Daniela Giovannini - CNR/IBCN, Roma  
Francesco Reale - CNR/ISC, Roma

The Golden Age of Cataclysmic Variables  
and Related Objects - II