

# **Variable Galactic Gamma-Ray Sources VII (VGGRS VII)**

Tuesday 6 May 2025 - Thursday 8 May 2025

Facultat de Física



## **Book of Abstracts**



# Contents

On the Physics at the Highest Energies of Gamma-Ray Emitting Binaries . . . . .	1
Multi-wavelength properties of binary pulsar system PSR B1259-63/LS2883 . . . . .	1
Gamma-ray Variability in Millisecond Pulsar Binaries: Probing Pulsar-Companion Interactions . . . . .	1
Results of the long-term campaign on Cygnus X-3 by MAGIC . . . . .	1
Massive stars as non-thermal sources . . . . .	1
Observations of Galactic binaries in the sub-MeV/MeV band with future prospects . . . .	2
Non-thermal emission from colliding stellar winds . . . . .	2
The challenges of identifying Particle-Accelerating Colliding-Wind Binaries . . . . .	2
Solving the Puzzle of Cyg X-3: Gamma-Ray Clues into Jet Dynamics . . . . .	2
Numerical simulations of microquasar jets . . . . .	2
Fermi-LAT view on binary systems . . . . .	3
Fermi-type Particle Acceleration in Microquasar Jets . . . . .	3
MAGIC view on binary systems . . . . .	3
Reinvestigating the orbit of HESS J0632+057 with SALT . . . . .	3
Investigating the effect of Be discs on the emission from gamma-ray binaries . . . . .	4
Counterparts of X-ray and gamma-ray binaries . . . . .	4
High-resolutions simulations of LS 5039 - energetic particles and non-thermal emission .	4
Ultrahigh-energy gamma-ray emissions associated with Black Hole-Jet Systems . . . . .	4
An X-ray eye on microquasar jets and their impact on the surrounding medium . . . . .	4
Detections of binaries with HAWC . . . . .	5
ALMA Observations of the Gamma-Ray Binary System PSR B1259-63/LS 2883 . . . . .	5
Exploring the environment of Cygnus X-3 . . . . .	5

Paying homage to Prof. Josep Maria Paredes: nearly four decades of friendship and collaboration . . . . .	5
Gamma-ray binaries as probes for Fast Radio Bursts . . . . .	6
A methodology for light curve comparison: applications to pulsars and transitional pulsars . . . . .	6
Results from Long-Term Radio Monitoring of LS I +61°303 at 15 GHz . . . . .	6
A revised orbital solution for HESS J0632+057 (=MWC 148) . . . . .	6
VHE gamma-ray novae: RS Oph modelling & CTAO perspectives . . . . .	6
The power of jets in microquasars and their multi-wavelength emission . . . . .	7
VERITAS observations of gamma-ray binaries and microquasars. . . . .	7
LSI 61 +303 - 16 years of GeV observations . . . . .	7
Galactic runaway O and Be stars found using Gaia DR3 and new stellar bow shocks . . . . .	7
O-type runaway binaries with compact objects . . . . .	8
MAGIC view on binary systems . . . . .	8
VERITAS and gamma-ray binaries/microquasars . . . . .	8
H.E.S.S. Observations of Binary Systems . . . . .	8
LST view on variable galactic gamma-ray sources . . . . .	8
Ultrahigh-energy gamma-ray emissions associated with Black Hole-Jet Systems . . . . .	8
Detections of binaries with HAWC . . . . .	9
SS 433 seen in Gamma Rays . . . . .	9
VHE gamma-ray novae: RS Oph modelling & CTAO perspectives . . . . .	9
Results of the long-term campaign on Cygnus X-3 by MAGIC . . . . .	9
Fermi-LAT view on binary systems . . . . .	9
Observations of Galactic binaries in the sub-MeV/MeV band with future prospects . . . . .	9
Gamma-ray Variability in Millisecond Pulsar Binaries: Probing Pulsar-Companion Interactions . . . . .	9
A methodology for light curve comparison: applications to pulsars and transitional pulsars . . . . .	9
Discussion . . . . .	9
LSI +61 303 —16 years of GeV observations . . . . .	10
Results from Long-Term Radio Monitoring of LS I +61°303 at 15 GHz . . . . .	10

An X-ray eye on microquasar jets and their impact on the surrounding medium . . . . .	10
Multi-wavelength properties of binary pulsar system PSR B1259-63/LS2883 . . . . .	10
ALMA observations of binary pulsar PSR B1259-63/LS2883 . . . . .	10
Gamma-ray binaries as probes for Fast Radio Bursts . . . . .	10
Counterparts of X-ray and gamma-ray binaries . . . . .	10
Galactic runaway O and Be stars found using Gaia DR3 and new stellar bow shocks . . .	10
O-type runaway binaries with compact objects . . . . .	11
Discussion . . . . .	11
Paying homage to Prof. Josep Maria Paredes: nearly four decades of friendship and collaboration . . . . .	11
A life in science: Josep Maria Paredes and multi-frequency astrophysics . . . . .	11
Josep Maria Paredes: A Lifelong Friend, Collaborator, and the 'Fuel Station of Talents' for My High-Energy Astrophysics Network . . . . .	11
The first steps in Science . . . . .	11
The contribution of Josep Maria Paredes to the MAGIC Collaboration . . . . .	11
Exploring the environment of Cygnus X-3 . . . . .	11
Investigating the effect of Be discs on the emission from gamma-ray binaries . . . . .	12
A revised orbital solution for HESS J0632+057 (=MWC 148) . . . . .	12
Reinvestigating the orbit of HESS J0632+057 with SALT . . . . .	12
Non-thermal emission from colliding stellar winds . . . . .	12
The challenges of identifying Particle-Accelerating Colliding-Wind Binaries . . . . .	12
Massive stars as non-thermal sources . . . . .	12
Solving the Puzzle of Cyg X-3: Gamma-Ray Clues into Jet Dynamics . . . . .	12
Numerical simulations of microquasar jets . . . . .	12
The power of jets in microquasars and their multi-wavelength emission . . . . .	12
High-resolutions simulations of LS 5039 - energetic particles and non-thermal emission .	13
Fermi-type Particle Acceleration in Microquasar Jets . . . . .	13
On the physics at the highest energies of gamma-ray emitting binaries . . . . .	13
Discussion and farewell . . . . .	13



3

## On the Physics at the Highest Energies of Gamma-Ray Emitting Binaries

**Author:** Valenti Bosch-Ramon<sup>1</sup>

<sup>1</sup> *Universitat de Barcelona/ICCUB*

**Corresponding Author:** vbosch@fqa.ub.edu

4

## Multi-wavelength properties of binary pulsar system PSR B1259-63/LS2883

**Authors:** Brian Van Soelen<sup>1</sup>; Denys Malyshev<sup>2</sup>; Masha Chernyakova<sup>3</sup>

<sup>1</sup> *University of the Free State*

<sup>2</sup> *Tubingen University*

<sup>3</sup> *DCU*

**Corresponding Authors:** masha.chernyakova@dcu.ie, vangoelenb@ufs.ac.za, denys.malyshev@astro.uni-tuebingen.de

5

## Gamma-ray Variability in Millisecond Pulsar Binaries: Probing Pulsar-Companion Interactions

**Authors:** Chanho Kim<sup>1</sup>; Hongjun An<sup>1</sup>; Jaegeun Park<sup>1</sup>

<sup>1</sup> *Chungbuk National University*

**Corresponding Authors:** geunjaep@gmail.com, an.hong.jun@gmail.com, chan814391@gmail.com

6

## Results of the long-term campaign on Cygnus X-3 by MAGIC

**Author:** Edgar Molina<sup>1</sup>

<sup>1</sup> *Instituto de Astrofísica de Canarias (IAC)*

**Corresponding Author:** emolina@iac.es

7

## Massive stars as non-thermal sources

**Author:** Paula Benaglia<sup>1</sup>

<sup>1</sup> *Instituto Argentino de Radioastronomía*

**Corresponding Author:** pben.radio@gmail.com

8

## Observations of Galactic binaries in the sub-MeV/MeV band with future prospects

**Author:** Hiroki Yoneda<sup>None</sup>

**Corresponding Author:** hiroki.yoneda.phys@gmail.com

9

## Non-thermal emission from colliding stellar winds

**Author:** Santiago del Palacio<sup>1</sup>

<sup>1</sup> *Chalmers University of Technology*

**Corresponding Author:** santiagodp1990@gmail.com

10

## The challenges of identifying Particle-Accelerating Colliding-Wind Binaries

**Author:** Michaël De Becker<sup>1</sup>

<sup>1</sup> *University of Liège*

**Corresponding Author:** michael.debecker@uliege.be

11

## Solving the Puzzle of Cyg X-3: Gamma-Ray Clues into Jet Dynamics

**Author:** Anton Dmytriev<sup>1</sup>

<sup>1</sup> *North-West University*

**Corresponding Author:** amdname@gmail.com

12

## Numerical simulations of microquasar jets

**Author:** Manel Perucho Pla<sup>1</sup>

**Co-authors:** Jose López-Miralles ; José-María Martí Puig <sup>1</sup>; Valenti Bosch-Ramon <sup>2</sup>

<sup>1</sup> *Universitat de València*

<sup>2</sup> *Universitat de Barcelona/ICCUB*

**Corresponding Authors:** jose.lopezmiralles@ext.esa.int, manel.perucho@valencia.edu, vbosch@fqa.ub.edu, jose-maria.marti@uv.es

13

## Fermi-LAT view on binary systems

**Author:** Guillem Martí-Devesa<sup>1</sup>

<sup>1</sup> *Università degli Studi di Trieste / INFN*

**Corresponding Author:** guillem.marti-devesa@ts.infn.it

14

## Fermi-type Particle Acceleration in Microquasar Jets

**Author:** Frank Rieger<sup>1</sup>

<sup>1</sup> *IPP Garching*

**Corresponding Author:** frank.rieger@ipp.mpg.de

15

## MAGIC view on binary systems

**Author:** Alicia López-Oramas<sup>1</sup>

<sup>1</sup> *Instituto de Astrofísica de Canarias (IAC)*

**Corresponding Author:** alicia.lopez@iac.es

16

## Reinvestigating the orbit of HESS J0632+057 with SALT

**Authors:** Brian van Soelen<sup>1</sup>; Natalie Matchett<sup>1</sup>

<sup>1</sup> *University of the Free State*

**Corresponding Authors:** vangoelenb@ufs.ac.za, natmatch98@gmail.com

17

## Investigating the effect of Be discs on the emission from gamma-ray binaries

**Authors:** Brian van Soelen<sup>1</sup>; Natalie Matchett<sup>1</sup>

<sup>1</sup> *University of the Free State*

**Corresponding Authors:** natmatch98@gmail.com, vangoelenb@ufs.ac.za

18

## Counterparts of X-ray and gamma-ray binaries

**Author:** Ignacio Negueruela<sup>1</sup>

<sup>1</sup> *Universidad de Alicante*

**Corresponding Author:** ignacio.negueruela@ua.es

19

## High-resolutions simulations of LS 5039 - energetic particles and non-thermal emission

**Authors:** David Huber<sup>1</sup>; Philipp Gschwandtner<sup>1</sup>; Ralf Kissmann<sup>1</sup>

<sup>1</sup> *Universität Innsbruck*

**Corresponding Authors:** philipp.gschwandtner@uibk.ac.at, ralf.kissmann@uibk.ac.at

20

## Ultrahigh-energy gamma-ray emissions associated with Black Hole-Jet Systems

**Author:** Ruoyu Liu<sup>1</sup>

<sup>1</sup> *Nanjing University*

**Corresponding Author:** ryliu@nju.edu.cn

21

## An X-ray eye on microquasar jets and their impact on the surrounding medium

**Author:** Samar Safi-Harb<sup>1</sup>

<sup>1</sup> University of Manitoba

**Corresponding Author:** samar.safi-harb@umanitoba.ca

22

## Detections of binaries with HAWC

**Author:** Sabrina Casanova<sup>1</sup>

<sup>1</sup> IFJ PAN

**Corresponding Author:** sabrina.casanova@ifj.edu.pl

23

## ALMA Observations of the Gamma-Ray Binary System PSR B1259-63/LS 2883

**Author:** Yutaka Fujita<sup>1</sup>

**Co-authors:** Akiko Kawachi<sup>2</sup>; Atsuo Okazaki<sup>3</sup>; Hiroshi Nagai<sup>4</sup>; Norita Kawanaka<sup>1</sup>; Takuya Akahori<sup>4</sup>

<sup>1</sup> Tokyo Metropolitan University

<sup>2</sup> Tokai University

<sup>3</sup> Hokkai-Gakuen University

<sup>4</sup> National Astronomical Observatory Japan

**Corresponding Authors:** y-fujita@tmu.ac.jp, kawachi@tokai.ac.jp

24

## Exploring the environment of Cygnus X-3

**Author:** Pedro Luque-Escamilla<sup>1</sup>

**Co-authors:** Josep Maria Paredes<sup>2</sup>; Josep Martí<sup>3</sup>; Valenti Bosch-Ramon<sup>4</sup>

<sup>1</sup> UJA

<sup>2</sup> Universitat de Barcelona

<sup>3</sup> Universidad de Jaén

<sup>4</sup> Universitat de Barcelona/ICCUB

**Corresponding Authors:** vbosch@fqa.ub.edu, peter@ujaen.es, jmparedes@ub.edu, jmarti@ujaen.es

26

## Paying homage to Prof. Josep Maria Paredes: nearly four decades of friendship and collaboration

**Author:** Josep Martí<sup>1</sup>

<sup>1</sup> Universidad de Jaén

**Corresponding Author:** jmarti@ujaen.es

27

## Gamma-ray binaries as probes for Fast Radio Bursts

**Author:** Benito Marcote<sup>1</sup>

<sup>1</sup> Joint Institute for VLBI ERIC (JIVE)

**Corresponding Author:** marcote@jive.eu

28

## A methodology for light curve comparison: applications to pulsars and transitional pulsars

**Author:** Diego F Torres<sup>1</sup>

<sup>1</sup> ICREA & Institute of Space Science (ICE, CSIC)

**Corresponding Author:** dtorres@ice.csic.es

29

## Results from Long-Term Radio Monitoring of LS I +61°303 at 15 GHz

**Author:** Frederic Jaron<sup>1</sup>

<sup>1</sup> TU Wien

**Corresponding Author:** fjaron@mpifr-bonn.mpg.de

30

## A revised orbital solution for HESS J0632+057 (=MWC 148)

**Author:** Jorge Casares<sup>1</sup>

<sup>1</sup> Instituto de Astrofísica de Canarias

**Corresponding Author:** jorge.casares@iac.es

31

## VHE gamma-ray novae: RS Oph modelling & CTAO perspectives

**Author:** Arnau Aguasca-Cabot<sup>1</sup>

**Co-authors:** Pol Bordas<sup>2</sup>; David Green<sup>3</sup>; Yukihiko Kobayashi<sup>4</sup>; Ruben Lopez Coto<sup>5</sup>; Marc Ribó<sup>6</sup>; Julian Sitarek<sup>7</sup>; the CTAO-LST Project

<sup>1</sup> Universitat de Barcelona - ICCUB - IEEC

<sup>2</sup> ICCUB

<sup>3</sup> CTAO

<sup>4</sup> Institute for Cosmic Ray Research, University of Tokyo

<sup>5</sup> Instituto de Astrofísica de Andalucía-CSIC

<sup>6</sup> Universitat de Barcelona, ICCUB, IEEC

<sup>7</sup> University of Lodz

**Corresponding Authors:** mribo@fqa.ub.edu, arnau.aguasca@fqa.ub.edu, rlopezcoto@iaa.es, pbordas@fqa.ub.edu

32

## The power of jets in microquasars and their multi-wavelength emission

**Author:** Dmitry Khangulyan<sup>1</sup>

<sup>1</sup> IHEP

**Corresponding Author:** khangulyan@ihep.ac.cn

33

## VERITAS observations of gamma-ray binaries and microquasars.

**Author:** Gernot Maier<sup>1</sup>

<sup>1</sup> DESY

**Corresponding Author:** gernot.maier@desy.de

34

## LSI 61 +303 - 16 years of GeV observations

**Author:** Daniela Hadasch<sup>None</sup>

**Corresponding Author:** dhadasch@ice.csic.es

35

**Galactic runaway O and Be stars found using Gaia DR3 and new stellar bow shocks****Author:** Marc Ribó<sup>1</sup><sup>1</sup> *Universitat de Barcelona, ICCUB, IEEC***Corresponding Author:** mribo@fqa.ub.edu

36

**O-type runaway binaries with compact objects****Author:** Mar Carretero-Castrillo<sup>1</sup>**Co-authors:** Marc Ribó<sup>2</sup>; Josep Maria Paredes<sup>3</sup><sup>1</sup> *ICCUB, Universitat de Barcelona*<sup>2</sup> *Universitat de Barcelona, ICCUB, IEEC*<sup>3</sup> *Universitat de Barcelona***Corresponding Authors:** mcarretero@fqa.ub.edu, jmparedes@ub.edu, mribo@fqa.ub.edu

37

**MAGIC view on binary systems**

38

**VERITAS and gamma-ray binaries/microquasars**

39

**H.E.S.S. Observations of Binary Systems**

40

**LST view on variable galactic gamma-ray sources**

41

**Ultrahigh-energy gamma-ray emissions associated with Black Hole-Jet Systems**

42

**Detections of binaries with HAWC**

43

**SS 433 seen in Gamma Rays**

44

**VHE gamma-ray novae: RS Oph modelling & CTAO perspectives**

45

**Results of the long-term campaign on Cygnus X-3 by MAGIC**

46

**Fermi-LAT view on binary systems**

47

**Observations of Galactic binaries in the sub-MeV/MeV band with future prospects**

48

**Gamma-ray Variability in Millisecond Pulsar Binaries: Probing Pulsar-Companion Interactions**

49

**A methodology for light curve comparison: applications to pulsars and transitional pulsars**

50

## Discussion

51

### **LSI +61 303 — 16 years of GeV observations**

52

### **Results from Long-Term Radio Monitoring of LS I +61°303 at 15 GHz**

53

### **An X-ray eye on microquasar jets and their impact on the surrounding medium**

54

### **Multi-wavelength properties of binary pulsar system PSR B1259-63/LS2883**

55

### **ALMA observations of binary pulsar PSR B1259-63/LS2883**

56

### **Gamma-ray binaries as probes for Fast Radio Bursts**

57

### **Counterparts of X-ray and gamma-ray binaries**

58

### **Galactic runaway O and Be stars found using Gaia DR3 and new stellar bow shocks**

59

**O-type runaway binaries with compact objects**

60

**Discussion**

61

**Paying homage to Prof. Josep Maria Paredes: nearly four decades of friendship and collaboration**

62

**A life in science: Josep Maria Paredes and multi-frequency astrophysics**

63

**Josep Maria Paredes: A Lifelong Friend, Collaborator, and the 'Fuel Station of Talents' for My High-Energy Astrophysics Network**

64

**The first steps in Science**

65

**The contribution of Josep Maria Paredes to the MAGIC Collaboration****Corresponding Author:** mribo@fqa.ub.edu

66

**Exploring the environment of Cygnus X-3**

67

**Investigating the effect of Be discs on the emission from gamma-ray binaries**

68

**A revised orbital solution for HESS J0632+057 (=MWC 148)**

69

**Reinvestigating the orbit of HESS J0632+057 with SALT**

71

**Non-thermal emission from colliding stellar winds**

72

**The challenges of identifying Particle-Accelerating Colliding-Wind Binaries**

73

**Massive stars as non-thermal sources**

74

**Solving the Puzzle of Cyg X-3: Gamma-Ray Clues into Jet Dynamics**

75

**Numerical simulations of microquasar jets**

76

**The power of jets in microquasars and their multi-wavelength emission**

77

**High-resolutions simulations of LS 5039 - energetic particles and non-thermal emission**

78

**Fermi-type Particle Acceleration in Microquasar Jets**

79

**On the physics at the highest energies of gamma-ray emitting binaries**

80

**Discussion and farewell**