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Giovanni Isopi

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Work [redacted]

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Gender [redacted] Date of birth: [redacted] Nationality: [redacted]

EDUCATION AND TRAINING

[10/31/2021 – Current]

PhD in Astronomy, Astrophysics and Space Science

La Sapienza University, Tor Vergata University and Istituto Nazionale di Astrofisica (joint PhD) https://www.uniroma1.it/en/

Address: Piazzale Aldo Moro, 5 , 00185 , Rome, Italy | **Field(s) of study:** Astrophysics, Cosmology | **Level in EQF:** EQF level 8 | **NQF Level:** Dottorato di ricerca

My PhD focuses on instrumental and observational aspects of radio-millimetre astronomy with large single dish radio telescopes such as the Sardinia Radio Telescope and the Green Bank Telescope, as well as observational data analysis.

Research experience:

1. **Development of the MISTRAL receiver for the Sardinia Radio Telescope**.
    a. Optimization and laboratory characterization of its Kinetic Inductance Detectors.
    b. FPGA-based read-out
    c. Optical calibration and mapping of MISTRAL's focal plane array.
    d. Sensitivity forecasts, simulation of observations, atmospheric noise filtering techniques and map-making.
2. **Commissioning of the MISTRAL receiver for the Sardinia Radio Telescope.**
    a. Installation of the instrument on the SRT.
    b. In-situ mainetence of the hardware.
    c. Data merging and software integration with SRT.
    d. On-sky calibration of the receiver.
    e. Map-making
3. **Observation of filaments between clusters with the Sunyaev-Zel'Dovich effect** with single-dish radio telescopes including Green Bank Telescope and Atacama Cosmology Telescope.
4. **Observation of Anomalous Microwave Emission** in galactic or extragalactic sources with single-dish radio telescopes, including Green Bank Telescope, Atacama Cosmology Telescope and Sardinia Radio Telescope, to constrain its polarization level.
5. **COSMO experiment** for the detection of CMB spectral distortion. Read-out electronics, optimization and laboratory characterization of its Kinetic Inductance Detectors.
6. **LUNAPOL experiment** for measuring the polarization of starlight from the surface of the moon. Optics and detector assembly from off-the-shelf components.

Outreach activities:

1. Ideation of questions for the "**Olimpiadi dello Spazio**", an inter-school competition about space-related topics, promoted by the CTNA (Cluster Tecnologico Nazionale Aerospazio).
2. Realization of instructional videos for schools involved the "**Space Dream**" program, a contest for schools about space, promoted by the CTNA (Cluster Tecnologico Nazionale Aerospazio)

Tutoring and teaching activities:

1. **Tutor and laboratory assistant** for the "**Laboratorio di astrofisica**" course (AA 2022/2023).
2. **Tutor and laboratory assistant** for the "**Laboratorio di astrofisica**" course (AA 2023/2024).
3. **Co-supervisor** of 4 bachelor's degree **theses in observational astronomy** using the TACOR telescope at the university "La Sapienza" or the instrumentation of the Campo Catino Observatory.

Observing experience:

1. Remote and visiting observer at the Sardinia Radio Telescope, project MISTRAL commissioning, 2 weeks remote, 2 weeks visiting.
2. Visiting pool observer at the IRAM-30m telescope with the NIKA2 camera, project 150-23, 1 week

[07/17/2024 – 07/19/2024]

ACT + SPT CMB summer school

University of Chicago https://www.uchicago.edu/

City: Chicago | **Country:** United States | **Field(s) of study:** Cosmology

- Simulation of CMB temperature and polarization maps
- Noise simulations and filtering
- Map-making (filter-and-bin, maximum likelihood)
- Power spectrum and cosmological parameters retrieval

[02/13/2022 – 02/17/2022]

SIGRAV International School 2022 on Cosmology: From Theory to Observation

Italian Society of General Relativity and Gravitation (SIGRAV) http://www.sigrav.org/

Field(s) of study: Astrophysics, Cosmology

- Early Universe, Inflation and Primordial Gravitational Waves
- Observational perspectives for the Cosmic Microwave Background
- Neutrino Cosmology and Dark Matter
- Modified gravity cosmology
- Machine learning in cosmology
- Cosmic Microwave Background phenomenology

[09/22/2019 – 09/28/2021]

Master's degree in Astronomy and Astrophysics

La Sapienza Università di Roma https://www.uniroma1.it/en/

Address: Piazzale Aldo Moro, 5, 00185, Roma, Italy | **Field(s) of study:** Astrophysics | **Final grade:** 110/110 with honors | **Level in EQF:** EQF level 7 | **NQF Level:** Laurea Magistrale | **Type of credits:** ETCS | **Number of credits:** 82 | **Thesis:** The MISTRAL receiver: readout electronics and observational strategies; Supervisor: Elia S. Battistelli

Physics of plasma; Radiative processes in Astrophysics; General Relativity; Stellar structure and evolution; Physical Cosmology; Astronomical Optics; Planets and Exoplanets; Laboratory activities regarding K-band observations with Sardinia Radio Telescope (SRT) and mm-band observations with Green Bank Telescope (GBT); Computing Algorithms in C and C++; Differential Equation Algorithms; Elements of Nuclear Physics, Particle Physics and Quantum Field Theory; Chemical evolution of the universe (BBN, stellar nucleosynthesis and supernovae nucleosynthesis).

Won 3 scolarships:

- **Laboratory assistant** at "Laboratorio di Segnali e Sistemi e Laboratorio di Astrofisica" in the Physics Department;

- **Laboratory assistant** at "Laboratori didattici Bruno Pontecorvo" in the Physics Department for the following courses: "Laboratorio di Meccanica", "Laboratorio di Ottica", "Laboratorio di Elettromagnetismo e Circuiti";
- **Excellence programs**: High quality training programs in Astronomy and Astrophysics. Topic (work in progress): Flat Field calibration for the Ariel exoplanet characterization mission; Supervisor: Enzo Pascale.

Master Thesis:

- Observational strategies for single dish radio telescopes;
- Sunyaev Zel'Dovich effect in galaxy clusters;
- Kinetic Inductance Detectors, characterization and readout electronics.

Observing experiences:

- Visiting observer at the Sardinia Radio Telescope;
- Remote observer at the Green Bank Telescope.

[10/01/2016 – 09/30/2019]

Bachelor's degree in Physics

La Sapienza Università di Roma https://www.uniroma1.it/en/

Address: Piazzale Aldo Moro, 5, 00185, Roma, Italy | **Field(s) of study:** Physics | **Final grade:** 110/110 cum Laude | **Level in EQF:** EQF level 6 | **NQF Level:** Laurea | **Type of credits:** ECTS | **Number of credits:** 180 | **Thesis:** Photometric follow-up of Kepler-2 exoplanet candidates; Supervisor: Oscar Straniero

Mathematical Analysis; Linear Algebra; C programming; Numerical Algorithms in C language; Classical Mechanics; Analytical Mechanics; Thermodynamics; Classical Electromagnetism; Inorganic Chemistry; Elements of Complex and Functional Analysis; Quantum Mechanics; Statistical Mechanics; Special Relativity; Astronomy and Astrophysics; Astrophysics Laboratory; Fluid Dynamics; Atmospheric Sciences; Atomic Physics, Molecular Physics and Condensed Matter Physics; Classical Optics .

Thesis:

- CCD photometry of exoplanet candidates;
- Rejection of astrophysical false positives;
- Definition of exoplanet candidate classes for the upcoming TESS follow up observing project.

WORK EXPERIENCE

[08/09/2015 – Current]

Volunteer researcher and science communicator

Campo Catino Astronomical Observatory http://www.campocatinobservatory.org/

Address: Località Colle Pannunzio, Via Campo Catino, 02016, Guarcino (FR), Lazio, Italy | **Email address:** science@campocatinobservatory.org | **Business or sector:** Education

Research activities.

a. CCD photometry, astrometry, spectroscopy (slitless and with slit) with observatory class telescopes, including the 0.8m reflector telescope in Campo Catino and the 0.6m remote telescope in El Sauce, Chile.
b. Scheduling of in presence and remote observations.
c. Exoplanet photometry. Involved in NASA TESS Follow Up Observing Project Sub Group 1 (TFOP-SG1), providing follow-up observations of planetary candidates for TESS and Kepler-2 surveys.
d. Collaboration with EURASTER project for the characterization of minor bodies of the Solar System using stellar occultation photometry.

Outreach and science communication.

a. Guided visits and observations using the Observatory's instrumentation.
b. Astronomical observations in public places or schools with field telescopes.
c. Outreach talks and lessons for schools of every grade and general public.

d. Laboratory activities and talks about photometry for "AstroAcademy - Scuola Estiva di Astronomia UAI"
e. Organization of public outreach events such as conferences and exhibitions.

Outreach articles.

- "Una super-terra e due sub-nettuni per TESS, con l'aiuto dell'osservatorio di Campo Catino", Nuovo Orione, 2019
- "Il cielo dal balcone: riscoprire il primo telescopio", Coelum Astronomia, 2020

LANGUAGE SKILLS

Mother tongue(s): Italian

Other language(s):

English

LISTENING B2 **READING** B2 **WRITING** B2

SPOKEN PRODUCTION B2 **SPOKEN INTERACTION** B2

Spanish

LISTENING A2 **READING** A2 **WRITING** A2

SPOKEN PRODUCTION A2 **SPOKEN INTERACTION** A2

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

DIGITAL SKILLS

Digital Skills - Test Results

Information and data literacy	**ADVANCED**	Level 6 / 6
Communication and collaboration	**ADVANCED**	Level 5 / 6
Digital content creation	**ADVANCED**	Level 6 / 6
Safety	**ADVANCED**	Level 6 / 6
Problem solving	**ADVANCED**	Level 6 / 6

Results from self-assessment based on The Digital Competence Framework 2.1

My Digital Skills

Microsoft Office

Microsoft Word | Microsoft Powerpoint | Microsoft Excel

Google Workspace

Google spreadsheet | Google Drive | Google Forms | Google Docs | Google Colab | Gmail

Social media

Social Media | Instagram | Twitter | Facebook

Communications

Zoom | Skype | telegram | whatsapp | Google Meet

Graphics and video editing

Adobe Camera Raw | Adobe Photoshop | Adobe Premiere | Gimp | inkscape | adobe lightroom

Programming languages

LaTeX (advanced) | R (intermediate) | C (adanced) | C++ (advanced) | Matlab (intermediate) | Python (advanced)

Optical design
Zemax (intermediate)

PUBLICATIONS

[2024] **Measuring the CMB spectral distortions with COSMO: the multi-mode antenna system**

Reference: Manzan, E., et al.

[2024] **Observing galaxy clusters and the cosmic web through the Sunyaev Zel'dovich effect with MISTRAL**

Reference: Battistelli, E. S., et al.

[2024] **Measuring the CMB primordial B-modes with Bolometric Interferometry. Status and future prospects of the QUBIC experiment**

Reference: Mennella, A., et al.

Write here the description...

[2024] **GJ 238 b: A 0.57 Earth Radius Planet Orbiting an M2.5 Dwarf Star at 15.2 pc**

Reference: Tey, E., et al.

[2024] **Identification of the Top TESS Objects of Interest for Atmospheric Characterization of Transiting Exoplanets with JWST**

Reference: Hord, B. J, et al.

[2023] **The Atacama Cosmology Telescope: High-resolution component-separated maps across one-third of the sky**

Reference: Coulton, W. R., et al., 2023

Pulse Tube Cooler with > 100 m Flexible Lines for Operation of Cryogenic Detector Arrays at Large Radiotelescopes

Reference: Coppolecchia, A., et al., 2023, Journal of Low Temperature Physics, Volume 211, Issue 5-6, p415-425

[2023] **A 1.55 R⊕ habitable-zone planet hosted by TOI-715, an M4 star near the ecliptic South Pole**

Reference: Dransfield, G., et al., 2023, Accepted for publication in MNRAS

[2023] **Two super-Earths at the edge of the habitable zone of the nearby M dwarf TOI-2095**

Reference: Murgas, F., et al., 2023, Submitted to Astronomy & Astrophysics

[2023] **Two Warm Super-Earths Transiting the Nearby M Dwarf TOI-2095**

Reference: Quintana, E., et al., 2023, Submitted to AAS Journals

[2023] **The Atacama Cosmology Telescope: A Measurement of the DR6 CMB Lensing Power Spectrum and its Implications for Structure Growth**

Reference: Qu, F. J, et al., 2023

[2023] **Compact Sources in the A401-A399 Galaxy Cluster System observed at 90 GHz with the MUSTANG-2 Camera**

Reference: Isopi, G., et al., RNAAS, Volume 7, Issue 4, id.79.

[2023] **A Second Earth-Sized Planet in the Habitable Zone of the M Dwarf, TOI-700**

Reference: Gilbert, E. et al. (2023)

[2022] **The thermal and non-thermal components within and between galaxy clusters Abell 399 and Abell 401**

Reference: Radiconi, F. et al., MNRAS, Volume 517, Issue 4, pp.5232-5246

[2022] **MISTRAL and its KIDs**

Reference: Paiella, A., et al., Journal of Low Temperature Physics, vol. 209, issue 5-6, pp. 889-898

[2022] **Status of QUBIC, the Q&U Bolometer for Cosmology**

Reference: Mousset, L., et al., 2023, 33rd Rencontres de Blois

[2022] **Status of Cosmic Microwave Background Observations for the Search of Primordial Gravitational Waves**

Reference: Battistelli, E. S., et al., Universe, vol. 8, issue 9, p. 489

[2022] **Millimetric Sardinia radio Telescope Receiver based on Array of Lumped elements kids**

Reference: D'Alessandro, G. et al., 2022, mm Universe @ NIKA2 - Observing the mm Universe with the NIKA2 cambe

[2022] **High angular resolution Sunyaev Zel'dovich observations: the case of MISTRAL**

Reference: Battistelli, E. S, et al., accepted for pubblication in the International Journal of Modern Physics

[2022] **Validation of 13 Hot and Potentially Terrestrial TESS Planets**

Reference: Giacalone, S. et al., 2022, AJ 163 99

[2021] **TOI 122b and TOI 237b: Two Small Warm Planets Orbiting Inactive M Dwarfs Found by TESS**

Reference: Waalkes, William C, et al., AJ 161 13

[2020] **The Magellan-TESS Survey I: Survey Description and Mid-Survey Results (in preparation)**

Reference: Teske, Johanna, et al., 2011.11560

[2020] **TOI-1235 b: A Keystone Super-Earth for Testing Radius Valley Emergence Models around Early M Dwarfs**

Reference: Cloutier, Ryan, et al., AJ 160 22.

[2020] **The First Habitable-zone Earth-sized Planet from TESS. I. Validation of the TOI-700 System**

Reference: Gilbert, Emily A, et al., AJ 160 116

[2020] **Precise mass and radius of a transiting super-Earth planet orbiting the M dwarf TOI-1235: a planet in the radius gap?**

Reference: Bluhm, P., et al., A&A, Volume 639

[2020] **A hot terrestrial planet orbiting the bright M dwarf L 168-9 unveiled by TESS**

Reference: Astudillo-Defru, N, et al., A&A, Volume 636

[2020] **An ultrahot Neptune in the Neptune desert**

Reference: Jenkins, James S., Nature Astronomy 4, 1148-1157

[2019] **A super-Earth and two sub-Neptunes transiting the nearby and quiet M dwarf TOI-270**

Reference: Günther, Maximilian N, et al., Nature Astronomy 3, 1099-1108

[2019] **TESS Hunt for Young and Maturing Exoplanets (THYME): A Planet in the 45 Myr Tucana-Horologium Association**

Reference: Newton, Elisabeth R, et al., ApJL 880 L17

[2019] **The L 98-59 System: Three Transiting, Terrestrial-size Planets Orbiting a Nearby M Dwarf**

Reference: Kostov, Veselin B., et al., AJ 158 32

[2019] **Follow-up of K2 Planet Candidates from TFOP-SG1**

Reference: Bieryla, A. et al., AAS Meeting Abstracts #233 233, 140.11

HONOURS AND AWARDS

[07/01/2022] **INRIM prize 2022 for the best master thesis Awarding institution:** Istituto Nazionale Ricerca Metrologica

Prize awarded to the 5 best master theses about precision measurements or study of phenomena or technology that could, directly or indirectly, contribute to the science of metrology or study of the natural laws.

Link: https://www.inrim.it/it/news/linrim-premia-5-giovani-laureati

CONFERENCES AND SEMINARS

[07/01/2024 – 07/05/2024] **The ACT bridge census: looking for bridges between interacting clusters with ACT DR6 (oral presentation)**
European Astronomical Society meeting, Padova, Italy

[07/01/2024 – 07/05/2024] **Observing the W-band sky from the Sardinia Radio Telescope with MISTRAL (poster contribution)**
European Astronomical Society meeting, Padova, Italy

[06/15/2024 – 06/21/2024] **MISTRAL: technical commissioning and first W-band photons from the Sardinia Radio Telescope**
SPIE telescopes and instrumentation conference, Yokohama, Japan

[10/02/2023 – 10/04/2023] **Quest for the cosmic web with high resolution SZ: from ACT to MISTRAL (oral presentation)**
12th Young Researcher Meeting, INAF Observatory of Rome, Monte Porzio Catone, Italy

[06/23/2023 – 06/28/2023] **MISTRAL: science perspectives and performance forecasts (poster contribution)**
LTD20 conference, Daejeon, South Korea

[12/12/2022 – 12/15/2022] **High resolution galactic science with MISTRAL (oral presentation)** Galactic Science and CMB Foregrounds Conference - San Cristobal de La Laguna, Tenerife, Spain

[09/04/2022 – 09/10/2022] **MISTRAL: MIllimeter Sardinia radio Telescope Receiver based on Array of Lumped elements kids (oral preentation)**
CASPER workshop 2022 - Cagliari, Italy