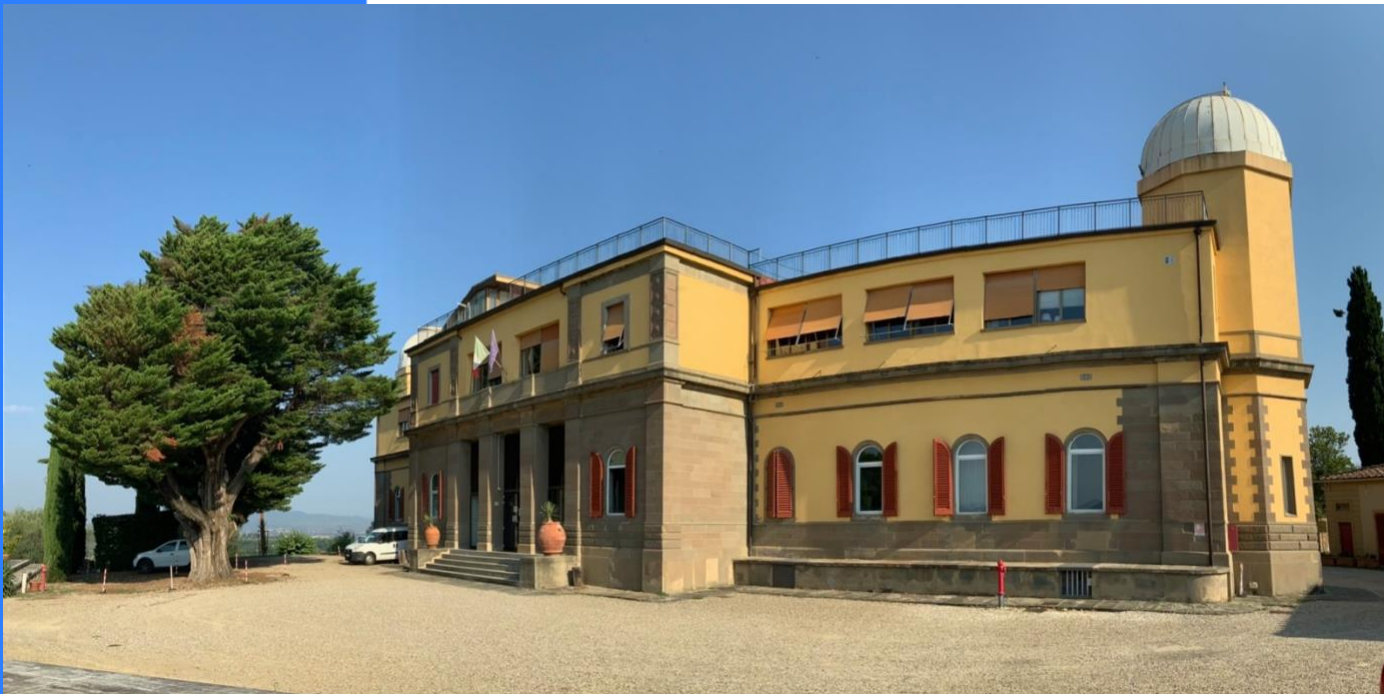


MONTHLY NEWSLETTER

INAF Osservatorio Astrofisico di Arcetri

HIGHLIGHT

New INSTITUTE COUNCIL



From February 16th 2023 the new Institute Council is in charge. It is composed by: Sofia Randich (Director), Edvige Corbelli (RSN1, elected member), Germano Sacco (RSN2, elected member), Aldo Dell'Oro (RSN3, appointed member), Giovanni Morlino (RSN4, elected member), Lorenzo Busoni (RSN5, elected member), Antonella Gasperini (elected member), Jacopo Lenzi (elected member), Serena Donati (appointed member).

REFEREED PUBLICATIONS

D. Fedele, F. Bollati, G. Lodato

Kinematics signature of a giant planet in the disk of AS 209

Astronomy & Astrophysics, in press

<https://www.aanda.org/component/article?access=doi&doi=10.1051/0004-6361/202244486>

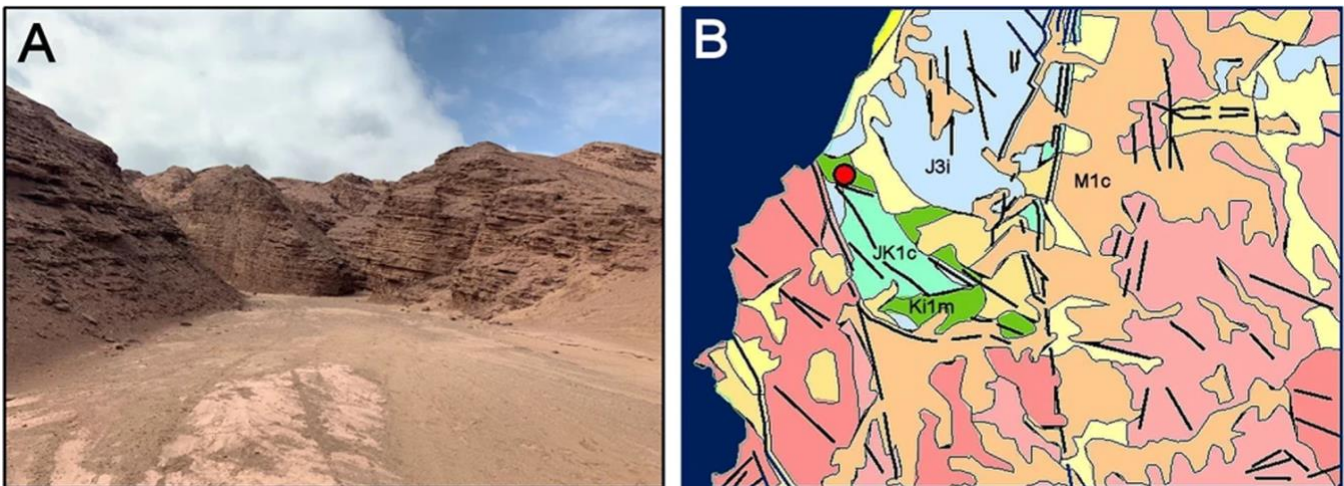
A. Azua-Bustos, [...], T. Fornaro, J. R. Brucato, G. Poggiali et al.

Dark microbiome and extremely low organics in Atacama fossil delta unveil Mars life detection limits

Nature Communications (2023), 14, 808

<https://www.nature.com/articles/s41467-023-36172-1>

Media INAF: <https://www.media.inaf.it/2023/02/21/pianeta-rosso-piedra-roja/>



A Panoramic view of the inspected site. **B** Geological map of the Caleta Coloso-El Way formation (SERNAGEOMIN, 2003. Mapa Geológico de Chile).

V. Lattanzi, F. O. Alves, M. Padovani, F. Fontani, et al.

SOLIS XVII. Jet candidate unveiled in OMC-2 and its possible link to the enhanced cosmic-ray ionisation rate

Astronomy & Astrophysics (2023), 671, A35

https://www.aanda.org/articles/aa/full_html/2023/03/aa42736-21/aa42736-21.html

F. Annibali, E. Pinna, L. K. Hunt et al.

DDO68 C: the actual appearance of a ghost satellite dwarf through adaptive optics at the Large Binocular Telescope

The Astrophysical Journal Letters (2023), 942 L23

<https://iopscience.iop.org/article/10.3847/2041-8213/acab63>

L. Bertini, V. Roccatagliata, M. Kim

Flybys in debris disk systems with Gaia eDR3

Astronomy & Astrophysics, in press

<https://www.aanda.org/component/article?access=doi&doi=10.1051/0004-6361/202245415>

D. S. Aguado, [...], S. Salvadori et al.

The pristine nature of SMSS 1605–1443 revealed by ESPRESSO

Astronomy & Astrophysics (2023), 669, L4

https://www.aanda.org/articles/aa/full_html/2023/01/aa45392-22/aa45392-22.html

Media INAF: <https://www.media.inaf.it/2023/01/10/origine-stella-antichissima/>

E. Caffau, [...], S. Salvadori et al.

The Pristine survey – XIX. Cu and Zn abundances in metal-poor giants

Monthly Notices of the Royal Astronomical Society (2023), 518, 3

<https://academic.oup.com/mnras/article-abstract/518/3/3796/6835551>

M. Rossi, S. Salvadori, Á. Skúladóttir, I. Vanni

Understanding the origin of CEMP-no stars through ultra-faint dwarfs

Monthly Notices of the Royal Astronomical Society: Letters, in press

<https://academic.oup.com/mnras/advance-article-abstract/doi/10.1093/mnras/slاد029/7057872>

D.S. Aguado, S. Salvadori, Á Skúladóttir, E. Caffau, P. Bonifacio, I. Vanni, V. Gelli, I.

Koutsouridou, A.M. Amarsi

PISN-explorer: hunting the descendants of very massive first stars

Monthly Notices of the Royal Astronomical Society (2023), 520, 1

<https://academic.oup.com/mnras/article-abstract/520/1/866/6994545>

TECHNOLOGICAL MILESTONES

ELT MORFEO Instrument Passes Preliminary Design Review



MORFEO, an upcoming instrument for ESO's Extremely Large Telescope (ELT), has recently passed its preliminary design review. MORFEO's adaptive optics system will use special sensors to measure the blurring effects of the Earth's atmosphere, correcting them with deformable mirrors.

The INAF Osservatorio Astrofisico di Arcetri has a major role in MORFEO in several key areas, with a team of 14 people involved between Science Team and Instrument development in a large range of activities: Adaptive Optics, simulation and performance estimation, development of the natural guide star wavefront sensor and of the deformable mirrors.

Team INAF-OAA: S. Esposito (Co-I, Steering Committee), L. Busoni (AO System Engineer, Project Office), G. Agapito (E2E Simulation WP Manager), M. Bonaglia (LOR WFS WP Manager), M. Xompero (Deformable Mirrors WP Manager), R. Briguglio (Deformable Mirrors specialist), G. Carlà (Adaptive Optics), P. Grani (LOR Designer), T. Lapucci (LOR WP), F. Mannucci (Science Team), A. Marasco (Science Team), C. Plantet (AO simulation), L. Podio (Science Team), A. Puglisi (Software Engineer).

Press release ESO: <https://www.eso.org/public/announcements/ann23002/>

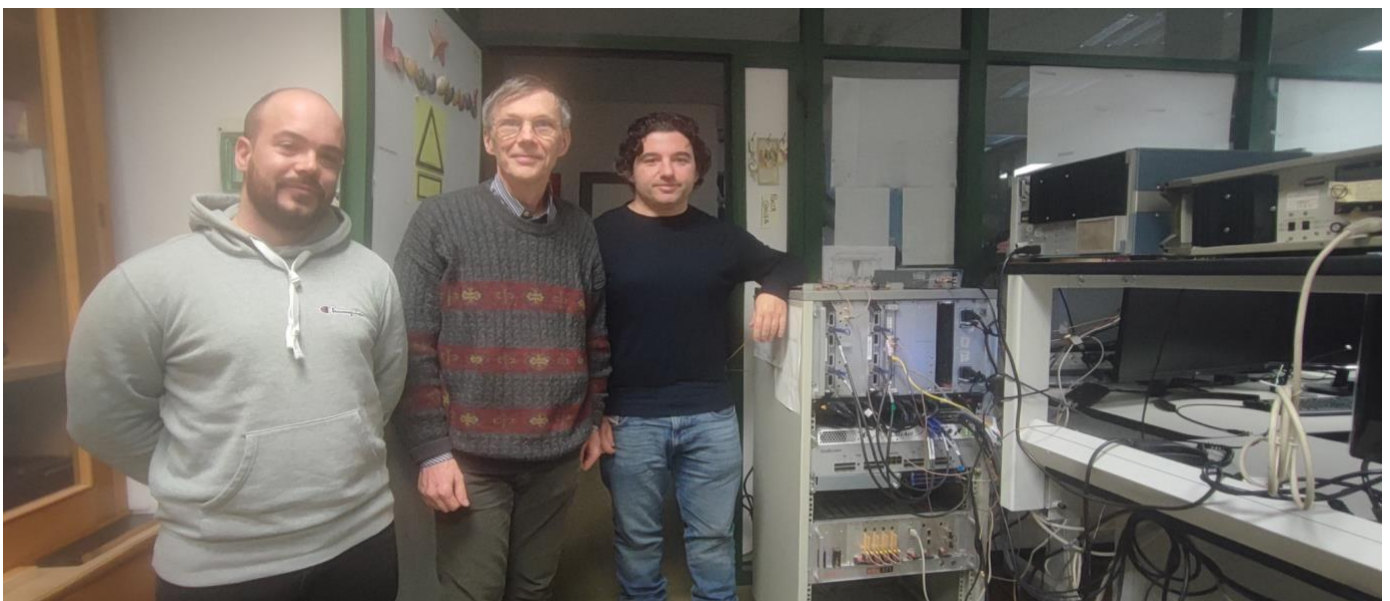
SKARAB test for the Sardinia Radio Telescope



In the framework of a [PON project "Enhancement of the Sardinia Radio Telescope for the study of the Universe at high radio frequencies - SRT - HighFreq"](#), financed with 18.6 Meuro and that involves four INAF institutes (OA Cagliari, OA Arcetri, IRA and OA Catania), twelve SKARABs (Square Kilometer Array Reconfigurable Application Board) were purchased for the Sardinia Radio Telescope .

G. Comoretto (INAF Arcetri) is the leader of the work package "Backends", which is providing the digital processing units for the new SRT multi-pixel receivers.

During the past two weeks G. Comoretto, together with A. Melis and A. Cabras (INAF Cagliari), tested and fine tuned the firmware for the observing modes that are going to be offered for the next SRT Call for Proposals.



From left to right: Alessandro Cabras (INAF Cagliari), Giovanni Comoretto (INAF Arcetri), Andrea Melis (INAF Cagliari).

SKARABs was originally designed to be employed for the MeerKAT digital correlator, each board is

based on a Xilinx Virtex 7 FPGA (Field Programmable Gate Array) technology. The FPGA implements spectrometers, correlators, beamformers, in order to analyze and preprocess the radio signals received by the radio telescope.

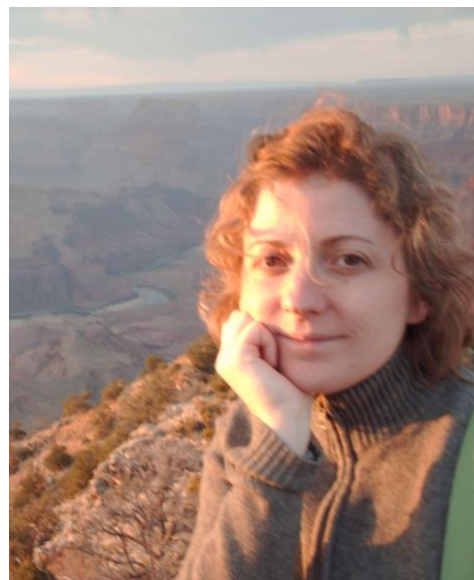
Thanks to this capability, FPGAs are massively used in radio astronomy because they are able to properly manage the huge flood of data provided by wideband and multi-pixel radio astronomical receivers. In addition, FPGAs use much less power with respect to GPUs or CPUs. As a FPGA is fully re-programmable, the same hardware can be updated to accommodate new, improved, versions of the instrument design.

The INAF Arcetri-Cagliari collaboration, in these years, has developed both the FPGA firmware and the acquisition software to implement digital spectrometers for all of the various scientific requests: continuum, spectroscopy, spectro-polarimetry, study of fast transients.

NEW ARRIVALS

RESEARCHER

Manuela Lippi - I am an expert in cometary science, astrobiology and high-resolution spectroscopy in the infrared. I just obtained one of the “Young Researchers - Seal of Excellence” research grant, funded by “Italia Domani - PNRR” and “EU-NextGenerationEU”, with a project about the study of molecular abundances in comets and their comparisons with the ones measured in protoplanetary disks, in order to better understand the processes that underlie the formation of our solar system. The project will combine my expertise in small bodies science with those on planet forming regions, well established at INAF-OAA. I obtained my PhD in 2010, at the Max Planck Institute for Solar System Research in Göttingen and the Technische Universität Braunschweig, with a work on high resolution spectroscopy of comets in the infrared. In 2017, after a career break from academic research, I was offered a position at NASA's Goddard Space Flight Center (Washington DC), to collaborate with Drs. G. L. Villanueva and M. J. Mumma on the reduction and analysis of high resolution infrared spectra of comets: the main goal of the project was to build a firm chemical database and classification for these bodies. From May 2021 to December 2022, I obtained a postdoc position at T.U. Braunschweig, Germany, where I was Involved in the ERC starting grant project: “CAstRA: Comet and Asteroid Re-Shaping through Activity” (P.I. Jessica Agarwal).



POSTDOCTORAL FELLOW

Stefano Menchiari - I obtained a master's degree in astrophysics at the University of Florence with a final research project in gamma-ray astronomy, focusing on detection techniques of very-high-energy sources in Galactic plane surveys from existing and future gamma-ray facilities. I obtained a Ph.D. at the University of Siena in experimental physics. My present work is centered on the investigation of young massive stellar clusters as high-energy and very-high-energy gamma-ray emitters. I am an active member of the Cherenkov Telescope Array community, where I am involved in the analysis of the gamma-ray emission from star-forming regions, as well as a partner of the MAGIC collaboration, where I am currently working on observations of high energy radiation from molecular clouds.



POSTDOCTORAL FELLOW



Veronica Roccatagliata - I am an astrophysicist with a broad research experience on star and planet formation. After my studies at University of Padova, I obtained my PhD degree at the University of Heidelberg and the Max-Planck-Institut fuer Astronomie. I worked at the Space Telescope Science Institute in Baltimore (USA), at the Ludwig-Maximilians-Universitaet in Munich, at the INAF Astrophysical Observatory of Arcetri and in 2018 I moved at the University of Pisa as a researcher. In February 2023 I joined the “*Stars, star formation and exoplanets*” group in INAF Arcetri, to investigate the formation and evolution of planetary systems combining data from VLT/ERIS, JWST and GAIA.

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