

MONTHLY NEWSLETTER

INAF Osservatorio Astrofisico di Arcetri

HIGHLIGHTS

An astronomical **pendulum** built in 1896 by Officina Galileo has recently been added to the Arcetri Observatory's collection of historical instruments. The clock was donated by Giacomo Franceschini, a descendant of one of the Florentine company's first owners, and it is now placed in the dome of the Amici telescope.

[Media INAF news](#)



Detail of the pendulum. Credit: S. Bianchi/INAF

The first full color images of the cosmos released by ESA's Euclid space mission were released on Nov. 7th, 2023.

[ESA press release](#) | [INAF Press release](#)

Media INAF TV - Interviews to **Leslie Hunt** (Euclid Consortium scientist)

[Prime immagini di Euclid: la galassia a spirale Ic 342](#)

[Prime immagini di Euclid: la galassia nana Ngc 6822](#)



Credit: ESA/Euclid/Euclid Consortium/NASA

TECHNOLOGICAL MILESTONES

Review of the optical test facility for the ELT adaptive mirror M4

In November 2023 the INAF M4 calibration team successfully completed the key milestone "Optical Test Tower Review".

M4 is the ELT's adaptive mirror, 2.5 m in diameter, with 5136 actuators to control its 6 segments, and is currently in integration in Italy, by the consortium AdOptica.

The INAF observatories of Arcetri and Merate participate in the project (as a subcontractor) with the responsibility of the optical calibration and verification of the mirror.

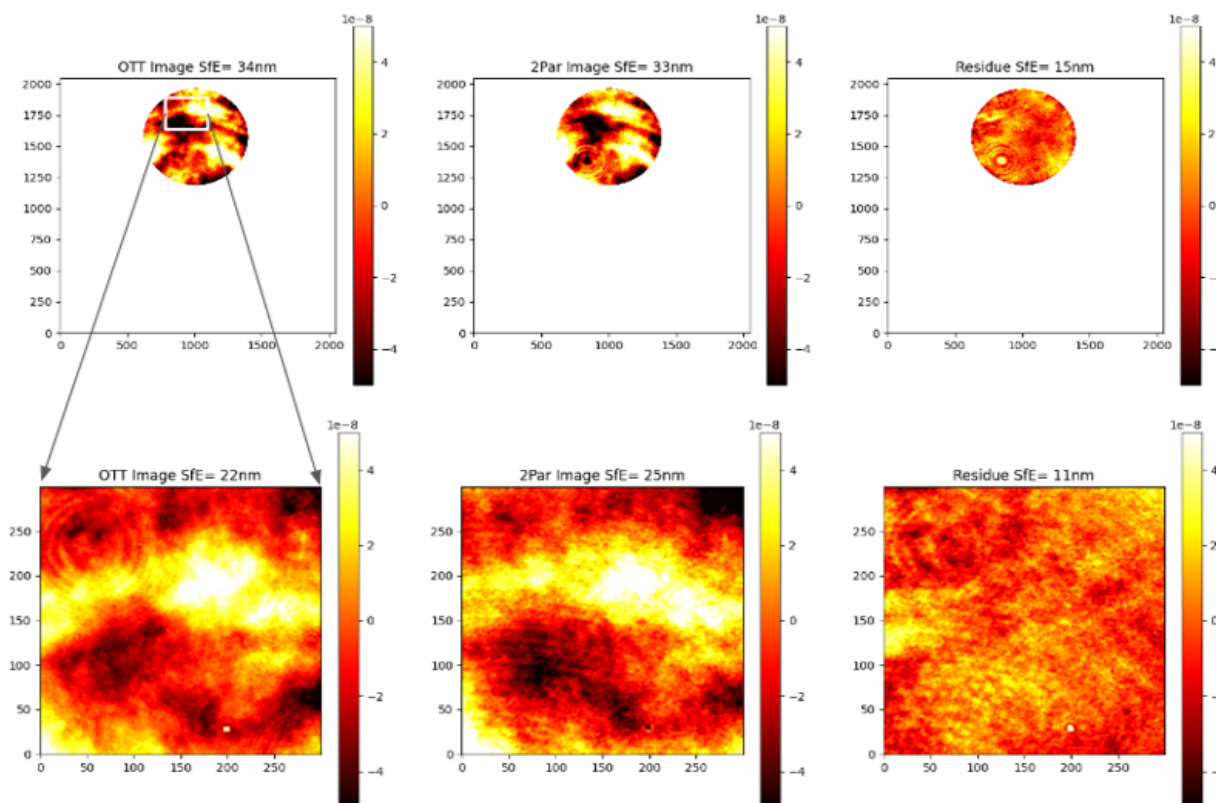
The Optical Test Tower OTT is a 10x10x10 m opto-mechanical facility, whose purpose is to allow the interferometric measurement of the M4 unit to complete its optical calibration and verification; the system includes an interferometer and 1.5 m parabolic mirror to illuminate and measure individually the 6 segments.

The work completed for the milestone included the installation, alignment and verification of the optical components, the fine-alignment and tracking of the OTT, the assessment of the measurement noise (vibrations and air convection). The review was held in Lecco at ADS International (part of the AdOptica consortium) on Nov 28th with ESO representatives; the next milestone is scheduled for Q1 2025 when the M4 mirror will be installed in the OTT, ready for the optical testing.



Team: A. Riccardi (contract responsible), N. Azzaroli, C. Selmi, M. Xompero and R. Briguglio.

Image: The OTT at ADS (Lc).



Sample of an OTT interferometric measurement: raw data (left); footprint of the parabolic mirror, after remapping and registration (middle), calibrated residue (right).

REFEREED PUBLICATIONS

F. Belfiore et al.

Calibrating mid-infrared emission as a tracer of obscured star formation on H II-region scales in the era of JWST

Astronomy & Astrophysics (2023), 678, A129

[RAI interview](#) to Francesco Belfiore

F. Fontani, C. Mininni, **M.T.C. Beltrán**, V. M. Rivilla, L. Colzi, I. Jiménez-Serra, Á. López-Gallifa, Á. Sánchez-Monge, S. Viti

The GUAPOS project: G31.41+0.31 Unbiased ALMA sPectral Observational Survey. IV. Phosphorus-bearing molecules and their relation with shock tracers

Astronomy & Astrophysics, in press

F. Fontani, E. Roueff, E. L. Colzi, L. P. Caselli

The evolution of sulphur-bearing molecules in high-mass star-forming cores

Astronomy & Astrophysics (2023), 680, A58

M. Padovani, D. Galli, L. H. Scarlett, T. Grassi, U. S. Rehill, M. C. Zammit, I. Bray, D. V. Fursa

Ultraviolet H₂ luminescence in molecular clouds induced by cosmic rays

Astronomy & Astrophysics, in press

L. Schey, J. Heidt, A. Pramskiy, D. Thompson, **G. Agapito**, **S. Esposito**, R. Gredel, D. Miller, **E. Pinna**, **A. Puglisi**, **F. Rossi**, W. Seifert, G. Taylor, A. Quirrenbach

Decomposition of the central structure of NGC 2273 in the NIR: a case study

Astronomische Nachrichten (2023), 344, 10

I. Ruffa, [...], **F. Lelli** et al.

A fundamental plane of black hole accretion at millimetre wavelengths

Monthly Notices of the Royal Astronomical Society Letters (2024), 528, 1

[Media INAF news](#)

Q. Tong Wu, [...], **M. Padovani** et al.

The Role of Low-energy (< 20 eV) Secondary Electrons in the Extraterrestrial Synthesis of Prebiotic Molecules

American Chemical Society, Earth Space Chemistry (2023)

S. Crowe, R. Fedriani, J. C. Tan, M. Whittle, Y. Zhang, A. Caratti o Garatti, J.P. Farias, A. Gautam, Z. Telkamp, B. Rothberg, M. Grudic, M. Andersen, G. Cosentino, R. Garcia-Lopez, V. Rosero, K. Tanaka, **E. Pinna, F. Rossi, D. Miller, G. Agapito, C. Plantet, E. Ghose, J. Christou, J. Power, A. Puglisi, R. Briguglio, G. Brusa, G. Taylor, X. Zhang, T. Mazzone, M. Bonaglia, S. Esposito, C. Veillet**

Near-Infrared Observations of Outflows and YSOs in the Massive Star-Forming Region AFGL 5180

Astronomy & Astrophysics, in press

Gaia Collaboration, [...], **S. Randich, A. Dell'Oro, E. Pancino, N. Sanna, L. Spina**

Gaia Focused Product Release: A catalogue of sources around quasars to search for strongly lensed quasars

Astronomy & Astrophysics, in press

Gaia Collaboration, [...], **S. Randich, A. Dell'Oro, E. Pancino, N. Sanna, M. Tsantaki**

Gaia Focused Product Release: Sources from Service Interface Function image analysis - Half a million new sources in omega Centauri

Astronomy & Astrophysics (2023), 680, A35

Gaia Collaboration, [...], **S. Randich, A. Dell'Oro, E. Pancino, N. Sanna, M. Tsantaki**

Gaia Focused Product Release: Radial velocity time series of long-period variables

Astronomy & Astrophysics (2023), 680, A36

L. Cavallo, **L. Spina**, G.Carraro, L. Magrini, E. Poggio, T. Cantat-Gaudin, M. Pasquato, S. Lucatello, S. Ortolani e J. Schiappacasse-Ulloa

Parameter Estimation for Open Clusters using an Artificial Neural Network with a QuadTree-based Feature Extractor

The Astronomical Journal 2024 AJ 167 12

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PROCEEDINGS

P. Di Ninni, T.D. Carozzi

Intrinsic Polarization in Polarimetrically Beamformed Arrays with Differentially Rotated Elements

Conference: International Conference on Electromagnetics in Advanced Applications (ICEAA), 2023

R. Spiga, C. Mignone

Theatre and Science fiction as a laboratory of future visions for Science: the case study of “2069 – Oltre la Luna”

in *Theatre about Science, Theory and Practice*, Imprensa da Universidade de Coimbra Conference: Theatre about Science International Conference, 2021

OTHER PUBLICATIONS

A. Gasperini, G. Strano

Firenze ricorda Margherita Hack nel centenario della nascita

Pontecorboli Editore, Firenze, 2023

R. Spiga

L'altra metà del cielo: Profili di donne astronome nell'Europa tra il XVI e il XVIII secolo

in *El no de las mujeres*, edited by Júlia Benavent and María José Bertomeu

Tirant Humanidades, Valencia, 2023

NEW ARRIVALS

POST-DOC FELLOW

Pierpaolo Merola



At INAF Arcetri Astrophysical Observatory I am working on the Ariel mission for exoplanet atmosphere observation. More specifically, I'm focusing on the electronical system and electro-magnetic compatibility on-board the satellite. My master thesis concerned simulated images of small impact on asteroid surface, where the solar pressure is the main responsible for small ejecta dust dynamics. Comparison with real images confirms the simulated model performances. As a space engineer from Politecnico di Milano, I'm very enthusiastic to work on a scientific satellite mission that allows me to get to know all the participants in the project: space agencies, scientific institutes, universities and industries. **Supervisor: Mauro Focardi.**