Mario Damiano

Ph.D. in Astrophysics

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Professional experience

2018 - present **JPL Postdoctoral Fellow**, National Aeronautics and Space Administration (NASA) – Jet Propulsion Laboratory (JPL) – California Institute of Technology, CA, United States.

2015 - 2020 **Research Associate**, National Institute for Astrophysics – Observatory of Palermo (INAF–OAPa), Palermo, Italy.

Education

2019 **Ph.D. in Astrophysics**, *University College London (UCL), London, England, UK*,
Advisors: Prof. Giovanna Tinetti, Dr. Giuseppina Micela, and Dr. Ingo Waldmann.
Thesis title: *Data analysis of space and ground observations of exoplanetary atmosphere using Machine Learning algorithms.*

2015 **MSc Physics (Astrophysics)**, *University of Palermo (UNIPA), Palermo, Italy.*,
Advisors: Prof. Giovanni Peres and Dr. Giuseppina Micela.
Thesis title: *Exoplanetary atmosphere: high-resolution spectrum with instruments iLocater and HIRES.*

2013 **BSc Physics Science**, *University of Palermo (UNIPA), Palermo, Italy.*,
Advisors: Prof. Giovanni Peres and Dr. Giuseppina Micela.
Thesis title: *Exoplanets and stellar activity in the IR-band.*

Research interests

- Composition and dynamic of exoplanetary atmospheres;
- Spectroscopic data analysis of observations recorded by space and ground facilities;
- Spectral interpretation through Bayesian information retrieval processes;
- Machine and Deep Learning algorithms for data analysis.

Awards, grants, and fellowships

- JPL Postdoctoral Fellowship, NASA/JPL, 2018
- Ph.D. studentship, European Research Council (ERC) and National Institute for Astrophysics (INAF), 2015

IT Skills

Coding Python, C, Matlab

OS MacOS (preferred), Linux, Windows

Text editing LaTeX, Microsoft Office, Apple Softwares

Invited colloquia and seminar talks

2020 'Exoplanetary Characterization Through Reflection Spectroscopy', JPL Postdoc Seminar Series, Jet Propulsion Laboratory, CA, US.

2019 'Two Lenses for Glasses: Low- and High-resolution Spectroscopic Observations of Exoplanetary Atmospheres', Yuk luncheon seminar, California Institute of Technology, CA, US.

2019 'Two Lenses for Glasses: Low- and High-resolution Spectroscopic Observations of Exoplanetary Atmospheres', JPL luncheon seminar, Jet Propulsion Laboratory, CA, US.

2017 'Spectroscopic observations of hot-Jupiters with the Hubble WFC3 camera', INAF-OAPa seminar series, INAF-Astronomical Observatory of Palermo (INAF-OAPa), Palermo, Italy.

Conference Presentations

2020 'Exoplanetary characterization through reflection spectroscopy', 2^{nd} Starshade Science Industry Partnership (SIP) forum, Boulder, CO, United States.

2020 'Exoplanetary characterization through reflection spectroscopy', 235^{th} American Astronomical Society (AAS) meeting, Honolulu, HI, United States.

2019 'Exoplanet reflected light retrieval: what can we learn?', Division Planetary Science (DPS) 51 / European Planetary Science Congress (EPSC) 14, Geneva, Switzerland.

2018 'Planetary signal extraction via high-resolution spectroscopy', Centre for Planetary Science (CPS) meeting, Mullard Space Science Laboratory (MSSL), England, UK.

2018 'Planetary signal extraction via high-resolution spectroscopy', Workshop for collaboration with Indian science community, University College London, London, England, UK.

2017 'Near-IR transmission spectrum of HAT-P-32b using WFC3 camera on board HST', European Planetary Science Congress (EPSC) 12, Riga, Latvia.

2017 'Planetary signal extraction via high-resolution spectroscopy: work in progress', 10^{th} GAPS2.0 meeting, Palermo, Italy.

2016 'Spectroscopic observations of hot-Jupiters with the Hubble WFC3 camera', Division for Planetary Sciences (DPS) 48 / European Planetary Science Congress (EPSC) 11, Pasadena, CA, US.

Competitively awarded observing time

2021-present 14.4 primary JWST hours awarded in Cycle 1. PI of GO-02334: *"Exploring the nature of a temperate exoplanet in the Fulton gap"*

2021-present 67.9 primary JWST hours awarded in Cycle 1. Co-I of GO-02372: *"Deep Characterization of the Atmosphere of a Temperate Sub-Neptune"*

2021-present 15.4 primary JWST hours awarded in Cycle 1. Co-I of GO-01952: *"Determining the Atmospheric Composition of the Super-Earth 55 Cancri e"*

2020-present 8 primary HST orbits awarded in mid Cycle 28. Co-I of GO-16448: *"Confirming a tentative detection of an atmosphere around a potentially rocky planet"*

Academic service

2021-present Referee activity for Nature Astronomy (NatAstron), Astronomy and Astrophysics (A&A).

Student advising

2017 Co-advised UNIPA master student for an internship on data analysis of high-resolution spectroscopic observations.
Palermo, Italy.

Publications

First author peer-reviewed manuscripts

5. *Reflected light of small planets I: determining the atmospheric composition of sub-Neptune planets*
Damiano, M. & Hu, R.,
AJ, 162, 200, Oct 2021 - DOI: 10.3847/1538-3881/ac224d

4. *Multi-orbital-phase and multi-band characterization of exoplanetary atmospheres with reflected light spectra*
Damiano, M., Hu, R., Hildebrandt, S. R.,
AJ, 160, 206, Nov 2020 - DOI: 10.3847/1538-3881/abb76a

3. *ExoReL$^{\Re}$: A Bayesian Inverse Retrieval Framework For Exoplanetary Reflected Light Spectra*
Damiano, M. & Hu, R.,
AJ, 159, 175, Mar 2020 - DOI: 10.3847/1538-3881/ab79a5

2. *A Principal Component Analysis-based Method to Analyze High-resolution Spectroscopic Data on Exoplanets*
Damiano, M., Micela, G., Tinetti, G.,
ApJ, 878, 153, June 2019 - DOI: 10.3847/1538-4357/ab22b2

1. *Near-IR transmission spectrum of HAT-P-32 b using HST/WFC3.*
Damiano, M., Morello, G., Tsiaras, A., Zingales, T., Tinetti, G.,
AJ, 154, 39, Jul 2017 - DOI: 10.3847/1538-3881/aa738b

Co-Author

7. *Unveiling shrouded oceans on temperate sub-Neptunes via transit signatures of solubility equilibria vs. gas thermochemistry*,
Hu, R., **Damiano, M.**, Scheucher, M., Kite, E., Seager, S., Rauer, H.,
ApJL, 921, L8, Oct 2021 - DOI: 10.3847/2041-8213/ac1f92

6. *Starshade Exoplanet Data Challenge*,
Hu, R., Hildebrandt, S. R., **Damiano, M.**, Shaklan, S., Martin, S., Lisman, D.,
JATIS, 7(2), 021216, Mar 2021 - DOI: 10.1117/1.JATIS.7.2.021216

5. *The Transiting Exoplanet Community Early Release Science Program for JWST*,
Bean, J.L., plus 96 co-authors,
PASP 130k4402, Nov 2018 - DOI: 10.1088/1538-3873/aadbf3

4. *A chemical survey of exoplanets with ARIEL*,
Tinetti, G., plus 242 co-authors,
Exp Astron 46, 135, Sep 2018 - DOI: 10.1007/s10686-018-9598-x

3. *A Population Study of Gaseous Exoplanets*,
Tsiaras, A., Waldmann, I.P., Zingales, T., Rocchetto, M., Morello, G., **Damiano, M.**, Karpouzas, K., Tinetti, G., McKemmish, L.K., Tennyson, J., and Yurchenko, S.N.,
AJ, 155, 156, Mar 2018 - DOI: 10.3847/1538-3881/aaaf75

2. *A New Approach to Analyzing HST Spatial Scans: The Transmission Spectrum of HD 209458 b*,
Tsiaras, A., Waldmann, I.P., Rocchetto, M., Varley, R., Morello, G., **Damiano, M.**, Tinetti, G.,
ApJ, 832, 202, Dec 2016 - DOI: 10.3847/0004-637X/832/2/202

1. *Detection of an Atmosphere Around the Super-Earth 55 Cancri e*,
Tsiaras, A., Rocchetto, M., Waldmann, I.P., Venot, O., Varley, R., Morello, G., **Damiano, M.**, Tinetti, G., Barton, E.J., Yurchenko, S.N., Tennyson, J.,
ApJ, 820, 99, Apr 2016 - DOI: 10.3847/0004-637X/820/2/99