

PROMOTION RECOMMENDATION  
The University of Michigan  
College of Literature, Science, and the Arts

Elena Gallo, associate professor of astronomy, with tenure, College of Literature, Science and the Arts, is recommended for promotion to professor of astronomy, with tenure, College of Literature, Science and the Arts.

Academic Degrees:

Ph.D.	2005	University of Amsterdam
B.S. and M.S.	2001	University of Milan

Professional Record:

2016–present	Associate Professor, Department of Astronomy, University of Michigan
2010–2016	Assistant Professor, Department of Astronomy, University of Michigan
2008–2010	Hubble Post-doctoral Fellow, Massachusetts Institute of Technology
2005–2008	Chandra Post-doctoral Fellow, University of California, Santa Barbara

Summary of Evaluation:

Teaching: Professor Gallo is a dedicated and effective teacher of both graduate and undergraduate students. She has taught a wide variety of the department's course offerings and receives excellent evaluations from her students. She has taught at all levels, from large undergraduate survey courses, to intensive senior-level courses for majors, to graduate courses. She has been a leader in the expansion and improvement of the department curriculum. She combines a rigorous approach to her classes with an effort to involve students in her research. Most of the graduate students and post-doctoral fellows who have worked with Professor Gallo have remained in the field.

Research: Since promotion to tenure, Professor Gallo has expanded her research portfolio, making substantial contributions across multiple areas of astronomy. Her primary research area has been the study of emission of radiation by gas accreting onto black holes (of all mass ranges) and the use of those studies to clarify the formation and evolution of supermassive and intermediate-mass (too heavy to come from the death of stars) black holes. She has worked on these problems across a broad front with clear promise of continued success. Additionally, since promotion she has opened up a new area of activity in the area of exoplanet research. She has worked on the tidal and magnetic interaction between stars and planets. A highlight of this work is the development of a promising tool for the future: a computer program that computes the hydrodynamics and radiation transfer in planetary atmospheres and exospheres much more efficiently and quickly than competing programs.

Recent and Significant Publications:

Plotkin, R. M., Gallo, E., Haardt, F., Miller, B. P., Wood, C. J. L., Reines, A. E., Wu, J., & Greene, J. E. (2016). The x-ray properties of million solar mass black holes. *The Astrophysical Journal*, 825(2), 139-153.

- Wu, J., Ghisellini, G., Hodges-Kluck, E., Gallo, E., Ciardi, B., Haardt, F., Sbarato, T., & Tavecchio, F. (2017). CMB-induced radio quenching of high-redshift jetted AGNs with highly magnetic hotspots. *Monthly Notices of the Royal Astronomical Society*, 468(1), 109-121.
- Gallo, E. & Sesana, A. (2019). Exploring the local black hole mass function below  $10^6$  solar masses. *The Astrophysical Journal Letters*, 883(1), L18-L23.
- Caldirola, A., Haardt, F., Gallo, E., Spinelli, R., Malsky, I., & Rauscher, E. (2021). Irradiation-driven escape of primordial planetary atmospheres: I. The ATES photoionization hydrodynamics code. *Astronomy & Astrophysics*, 655. <https://doi.org/10.1051/0004-6361/202141497>

Service: Professor Gallo has made extraordinary contributions to her department, to the university, and to the field. Within the department, she has served on several committees, including the important Hiring Priorities Committee, and as the graduate studies chair. She has also served on the Faculty Senate Assembly and on SACUA. Her extramural activities include chairing the Chandra (X-ray telescope facility) Users Committee and serving on science working groups for proposed NASA missions in the coming decade.

External Reviewers:

Reviewer (A): “Dr. Gallo’s recent works have presented exciting new discoveries, especially regarding moderate-mass black holes in dwarf galaxies, the local supermassive black hole occupation fraction, and the radio vs. X-ray luminosity plane.”

Reviewer (B): “Dr Gallo has always produced work of the very highest quality, and continues to do so. I think the thing which most characterizes her work is the attention to detail and care in drawing the correct conclusions from the data analyzed.”

Reviewer (C): “In recent years, [Professor Gallo] has expanded her research interests to include the topic of extrasolar planets, encompassing theoretical modeling. In a paper that recently appeared on the arXiv, she describes a new hydrodynamics code, ATES, to compute the impact of stellar radiation fields on the atmospheres of exoplanets. This work is timely and of great significance to studies of exoplanets...”

Reviewer (D): “She has a very sharp intellect and insight, plus significant creativity, which gives her an almost visionary knack for putting her finger on important problems. Dr. Gallo’s ability to anticipate major developments has consistently placed her ahead of the curve.”

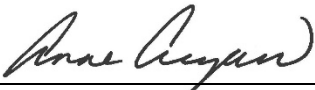
Reviewer (E): “She also occupies an important, but unfortunately not always appreciated, niche: that of a researcher who, having had a clear and important idea (of ways to search for low-mass central black holes due to their cosmological importance, or of ways to explore the importance of the CMB on high-redshift galaxies), is willing to pursue it systematically and with fully honest investigation and mitigation of possible weaknesses.”

Reviewer (F): “Dr. Gallo is an observer who is an expert on accreting black holes in our Galaxy, jets, and supermassive black holes in nearby galaxies. She uses observations to understand the connection between the accretion onto a black hole, the jets that are launched from the accretion

flows, and other characteristics of these systems...She has highly influential papers, with more than 500 citations, in this area that link jet activity with other accretion properties. This line of work addresses important, outstanding central questions in compact object astrophysics.”

Summary of Recommendation:

Professor Gallo has carried out frontier research into several aspects of black hole accretion processes and their emission of radiation at several wavelengths. She has expanded her range of interests to include the modeling of the irradiation of planetary atmospheres by stars. She has been an energetic and effective teacher of a large fraction of her department’s curriculum. Her impressive range of service activities include chairing the department’s graduate program, chairing the Chandra Users Committee, and serving on the Senate Assembly and on SACUA. The Executive Committee of the College of Literature, Science, and the Arts and I recommend that Associate Professor Elena Gallo be promoted to the rank of professor of astronomy, with tenure, College of Literature, Science, and the Arts.



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Anne Curzan, Dean  
Geneva Smitherman Collegiate Professor of  
English Language and Literature, Linguistics,  
and Education  
Arthur F. Thurnau Professor  
College of Literature, Science, and the Arts

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