

# Nils Hoyer

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Max-Planck-Institut für Astronomie  
Königstuhl 17  
D-69117, Heidelberg  
Germany

## Research interests

- Nuclear star cluster formation, evolution, and demographics
- Relation between nuclear star clusters and supermassive black holes, globular clusters, and ultra-compact dwarf galaxies
- Scaling relations between compact systems and host galaxies
- Semi-analytical galaxy formation models

## Work experience

### *Research assistant*

Max-Planck-Institut für Astronomie, Heidelberg, Germany  
Advisor: Dr. Nadine Neumayer

(Sep 2020 - Aug 2021)

### *Technical assistant*

Max-Planck-Institut für Astronomie, Heidelberg, Germany  
Advisor: Dr. Nadine Neumayer

(Sep 2019 - Aug 2020)

## Education

### *PhD in Astrophysics*

Max-Planck-Institut für Astronomie, Heidelberg, Germany  
Donostia International Physics Center, Donostia–San Sebastián, Spain  
Ruprecht-Karls-Universität Heidelberg, Heidelberg, Germany  
Advisors: Dr. Nadine Neumayer, Dr. Silvia Bonoli

(Oct 2021 - today)

### *Master of Science in Physics*

Max-Planck-Institut für Astronomie, Heidelberg, Germany  
Ruprecht-Karls-Universität Heidelberg, Heidelberg, Germany  
Advisors: Dr. Nadine Neumayer, Dr. Iskren Y. Georgiev  
Examiners: Dr. Nadine Neumayer, Prof. Dr. Hans-Walter Rix

(Mar 2018 - Oct 2020)

*Bachelor of Science in Physics* (Oct 2014 - Feb 2018)  
Landessternwarte Heidelberg, Heidelberg, Germany  
Ruprecht-Karls-Universität Heidelberg, Heidelberg, Germany  
Advisor: Prof. Dr. Jochen Heidt  
Examiners: Prof. Dr. Jochen Heidt, Prof. Dr. Andreas Quirrenbach

*Highschool diploma* (Aug 2006 - Jul 2014)  
Johannes-Althusius Gymnasium, Bad Berleburg, Germany  
Gymnasium Bayreuther Strasse, Wuppertal, Germany

## Scientific projects

*Development of a generic double-charm trigger line for Run III of the LHCb experiment* (Aug 2018 - Aug 2019)  
Physikalisches Institut Heidelberg, Heidelberg, Germany  
CERN, Esplanade des Particules 1, Geneva, Switzerland  
Advisors: Prof. Dr. Sebastian Neubert, Dr. Nicole Skidmore

*Generation of a quasar catalog optimized for adaptive optics-assisted observations at the Large Binocular Telescope* (Feb 2017 - May 2017)  
Landessternwarte Heidelberg, Heidelberg, Germany  
Advisors: Prof. Dr. Jochen Heidt

## Publications

7. N. Mayker Chen, M. A. Tucker, N. Hoyer, S. W. Jha, L. Kwok, A. K. Leroy, E. Rosolowsky, C. Ashall, G. Anand, F. Bigiel, M. Boquien, C. Burns, D. Dale, J. M. DerKacy, O. V. Egorov, L. Galbany, K. Grasha, H. Hassani, P. Hoefflich, E. Hsiao, R. S. Klessen, L. A. Lopez, J. Lu, N. Morrell, M. Orellana, F. Pinna, S. K. Sarbadhicary, E. Schinnerer, M. Shahbandeh, M. Stritzinger, D. Thilker, and T. G. Williams. Serendipitous Nebular-phase JWST Imaging of SN Ia 2021aefx: Testing the Confinement of  $^{56}\text{Co}$  Decay Energy. *The Astrophysical Journal Letters*, 944(2):L28, February 2023
6. N. Hoyer, F. Pinna, A. W. H. Kamlah, F. Noguerras-Lara, A. Feldmeier-Krause, N. Neumayer, M. C. Sormani, M. Boquien, E. Emsellem, A. C. Seth, R. S. Klessen, T. G. Williams, E. Schinnerer, A. T. Barnes, A. K. Leroy, S. Bonoli, J. M. D. Kruijssen, J. Neumann, P. Sánchez-Blázquez, D. A. Dale, E. J. Watkins, D. A. Thilker, E. Rosolowsky, F. Bigiel, K. Grasha, O. V. Egorov, D. Liu, K. M. Sandstrom, K. L. Larson, G. A. Blanc, and H. Hassani. PHANGS–JWST First Results: A combined *HST* and *JWST* analysis of the nuclear star cluster in NGC 628. *The Astrophysical Journal Letters*, 944(2):L25, February 2023
5. J. C. Lee, K. M. Sandstrom, A. K. Leroy, D. A. Thilker, E. Schinnerer, E. Rosolowsky, K. L. Larson, O. V. Egorov, T. G. Williams, J. Schmidt, E. Emsellem, G. S. Anand, A. T. Barnes, F. Belfiore, I. Bešlić, F. Bigiel, G. A. Blanc, A. D. Bolatto, M. Boquien, J. den Brok, Y. Cao, R. Chandar, J. Chastenet, M. Chevance, I-D. Chiang, E. Congui, D. A. Dale, S. Deger, C. Eibensteiner, C. M. Faesi, S. C. O. Glover, K. Grasha, B. Groves, H. Hassani, K. F. Henny, J. D. Henshaw, N. Hoyer, A. Hughes, S. Jeffreson, M. J. Jiménez-Donaire, J. Kim, H. Kim, R. S. Klessen, E. W. Koch, K. Kreckel, J. M. D. Kruijssen, J. Li, D. Liu, L. A. Lopez, D. Maschmann, N. Mayker Chen, S. E. Meidt, E. J. Murphy, J. Neumann, N. Neumayer, H.-A. Pan, I. Pessa, J. Pety, M. Querejeta, F. Pinna, M. Jimena Rodríguez, T. Saito, P. Sánchez-Blázquez, F. Santoro, A. Sardone, R. J. Smith, M. C. Sormani, F. Scheuermann, S. K. Stuber, J. Sutter, J. Sun, Y.-H. Teng, R. G. Tress, A. Usero, E. J. Watkins, B. C. Whitmore, and A. Razza. The PHANGS–JWST Treasury Survey:

Star Formation, Feedback, and Dust Physics at High Angular resolution in Nearby Galaxies. *The Astrophysical Journal Letters*, 944(2):L17, February 2023

4. N. Hoyer, N. Neumayer, A. C. Seth, I. Y. Georgiev, and J. E. Greene. Photometric and Structural Parameters of Newly Discovered Nuclear Star Clusters in Local Volume Galaxies. *Monthly Notices of the Royal Astronomical Society*, 520(3):4664–4682, January 2023
3. H. Haidar, M. Habouzit, M. Volonteri, M. Mezcua, J. Greene, N. Neumayer, D. Anglés-Alcázar, I. Martín-Navarro, N. Hoyer, Y. Dubois, and R. Davé. The black hole population in low-mass galaxies in large-scale cosmological simulations. *Monthly Notices of the Royal Astronomical Society*, 514(4):4912–4931, June 2022
2. N. Hoyer, N. Neumayer, I. Y. Georgiev, A. C. Seth, and J. E. Greene. The nucleation fraction of local volume galaxies. *Monthly Notices of the Royal Astronomical Society*, 507(3):3246–3266, November 2021
1. J. Heidt, A. Quirrenbach, N. Hoyer, D. Thompson, A. Pramskiy, G. Agapito, S. Esposito, R. Gredel, D. Miller, E. Pinna, A. Puglisi, F. Rossi, W. Seifert, and G. Taylor. 3C 294 revisited: Deep Large Binocular Telescope AO NIR images and optical spectroscopy. *Astronomy & Astrophysics*, 628:A28, August 2019

## Talks

- ZAH Teeminar (Jan 31, 2023)  
*A combined HST and JWST analysis of the nuclear star cluster in NGC 628*  
Zentrum für Astronomie, University of Heidelberg, Heidelberg, Germany (remote)
- MPIA Galaxy Coffee (Jan 19, 2023)  
*A combined HST and JWST analysis of the nuclear star cluster in NGC 628*  
Max-Planck-Institut für Astronomie, Heidelberg, Germany (remote)
- Durham FLAT (Nov 18, 2022)  
*A combined HST and JWST analysis of the nuclear star cluster in NGC 628*  
University of Durham, Durham, England
- L-Galaxies Workshop (Nov 16, 2022)  
*Star clusters in L-Galaxies: the next few years*  
University of Hertfordshire, Hatfield, England
- Origin, growth, and feedback of black holes in dwarf galaxies (Sep 15, 2022)  
*Nuclear star cluster properties unfold their formation mechanism in dwarf galaxies*  
Donostia International Physics Center, Donostia–San Sebastián, Spain
- MPE High-Energy seminar (Jul 25, 2022)  
*Nuclear star clusters: formation, evolution, and relation to black holes*  
Max-Planck-Institut für extraterrestrische Physik, Garching bei München, Germany
- MPIA Galaxy Coffee (May 05, 2022)  
*Reinforcing the connection between globular clusters and nuclear star clusters in low-mass galaxies*  
Max-Planck Institut für Astronomie, Heidelberg, Germany

- L-Galaxies Workshop (Sep 12, 2021)  
*Nuclear star clusters: demographics, formation scenarios, and open questions*  
 Donostia International Physics Center, Donostia–San Sebastián, Spain
- MPIA Galaxy Coffee (Nov 05, 2020)  
*Does the nucleation fraction depend on environment?*  
 Max-Planck Institut für Astronomie, Heidelberg, Germany (remote)
- Real-Time Analysis Trigger Meeting (Apr 05, 2019)  
*An inclusive trigger line for detached charm candidates*  
 LHCb, CERN, Geneva, Switzerland (remote)

## Teaching

- Teaching assistant for “Physik A” (WT 2022/2023)  
 Experimental physics for chemists and biologists  
 Lecturer: Prof. Dr. Norbert Christlieb
- Teaching assistant for “Physik B” (ST 2022)  
 Experimental physics for chemists and biologists  
 Lecturer: Prof. Dr. Norbert Christlieb
- Teaching assistant for “Einführung in die Astronomie 2” (ST 2022)  
 Introduction to astronomy for physics students  
 Lecturers: Dr. Dominika Wylezalek, Dr. Walter Dehnen

## Skills

- ▷ Languages—German (native), English (C1 level), Spanish (basics), Latin (Examen Latinum)
- ▷ Operating systems—Linux, BSD, Windows
- ▷ Programming languages—C, C++
- ▷ Scripting languages—Python, vim, shell, awk, sed
- ▷ Markup languages—Latex, Markdown, groff
- ▷ Astronomical software—Topcat, Aladin, ds9, IRAF, various Python packages
- ▷ Others—git, gimp, pmwiki, ROOT

## Publications covered in press releases

- ▷ *The James Webb Space Telescope Reveals the ‘Bones’ of Nearby Galaxies: New insight into where stars are being born in galaxies* (Feb 16, 2023)  
 Published by the Max-Planck-Institut für Astronomie (MPIA)  
 Written by Markus Nielbock
- ▷ *It’s Full of Stars: The Mysterious Heart of the Phantom Galaxy* (Jan 19, 2023)  
 Published by <https://www.astrobites.org>  
 Written by H. Perry Hatchfield

## Miscellaneous

- ▷ Member of the PHANGS collaboration since 2022

- ▷ Member of the eROSITA consortium since 2022
- ▷ Member of the L-Galaxies Team since 2021
- ▷ Co-organizer of the Galactic Nuclei group meetings since 2020
- ▷ Member of the Deutsche Physikalische Gesellschaft since 2014

### **Academic references**

Available on request.