Leonard Romano

Curriculum Vitae

Personal information

Date of Birth	July 28th 1997 in Munich
Nationality	German, Italian
marital status	married, no children
E-mail address	lromano@usm.lmu.de

Education

02/2022 until now	Doctoral candidate at LMU in computational astrophysics. Expected to have graduated by 8/2025. Supervisor: Prof. Dr. Andreas Burkert
10/2019 until 11/2021	**Master of Science in nuclear-, particle- and astrophysics at TUM (grade point average: 1.2)** **Master's thesis:** "Simulating the co-evolution of molecular hydrogen and the grain size distribution in an isolated galaxy" **(grade point average: 1.3)**
10/2016 until 09/2019	**Bachelor of Science in physics at TUM (grade point average: 1.6)**
10/2018 until 2/2019	**Exchange semester at Osaka University and Bachelor's thesis:** *"Baryonic feedback and small-scale problems in hydrodynamical ΛCDM simulations"* **(grade point average:1.7)**
6/2016	**General University Entrance Qualification** **(grade points: 1.7)**+ Certificate of the DPG for extraordinary achievements in the physics A-Level exam at Gymnasium Gröbenzell
9/2008 until 8/2016	**Gymnasium Gröbenzell (Highschool education)** **Seminar thesis:** *"komplexe Wechselstromrechnung"* (grade points: 11)

Languages

Englisch	C1
Chinese	A1
French	A2
Japanese	C1 (JLPT N1)
German	C2 (mother-tongue)

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IT-Skills

Programming	C, C++, Fortran, Python, Julia
Numerical Simulations	GADGET-3/4 (SPH), RAMSES (AMR)
Parallelization	MPI & OpenMP
HPC	> 10 MCPUh on MPCDF Infrastructure (Cobra & Viper)
Github	*github.com/leonardromano*

Teaching & Lab work

08/2017 – 03/2022	Tutor for various undergraduate mathematics courses at TUM
08/2019 – 08/2020	Technical student – PanEDM TUM
04/2019 – 09/2019	Technical student – ALICE TUM

Publications

[1] *SISSI: Supernovae in a stratified, shearing interstellar medium – I. The geometry of supernova remnants.* ***Romano L. E. C.****, Behrendt M., Burkert A., 2025, arXiv:2503.12977*

[2] *Starburst-Driven Galactic Outflows – Unveiling the Suppressive Role of Cosmic Ray Halos.* ***Romano L. E. C.****, Owen E. R., Nagamine K., 2025, arXiv:2503.13261*

[3] *Radial properties of dust in galaxies: Comparison between observations and isolated galaxy simulations. van der Giessen S. A., Matsumoto K., De Looze I.,* ***Romano L. E. C.****, Hirashita H., Nagamine, K., Baes, M., Palla M., Hou K.-C., Faesi C., 2024, A&A, 692, A39*

[4] *Star Formation by Supernova Implosion.* ***Romano L. E. C.****, Burkert A., Behrendt M., 2024, ApJL, 971(2), L44*

[5] *Observational signatures of the dust size evolution in isolated galaxy simulations. Matsumoto K., Hirashita H., Nagamine K., Van der Giessen S. A.,* ***Romano L. E. C.****, Relaño M., De Looze I., Baes M., Nersesian A., Camps P., Hou K. C., Oku Y., 2024, A&A, 689, A79*

[6] *Cloud Formation by Supernova Implosion.* ***Romano L. E. C.****, Behrendt M., Burkert A., 2024, ApJ, 965 (2), 168*

[7] *Dust grain size evolution in local galaxies: a comparison between observations and simulations.* Relaño M., De Looze I., Saintonge A., Hou K. C., **Romano L. E. C.**, Nagamine K., Hirashita H., Aoyama S., Lamperti I., Lisenfeld U., Smith M. W. L., Chastenet J., Xiao T., Gao Y., Sargent M., Van der Giessen S. A., 2022, MNRAS, 515, 5306

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[8] *The co-evolution of molecular hydrogen and the grain size distribution in an isolated galaxy.* **Romano L. E. C.**, Nagamine K., Hirashita H., 2022, MNRAS, 514, 1461

[9] *Dust diffusion in SPH simulations of an isolated galaxy.* **Romano L. E. C.**, Nagamine K., Hirashita H., 2022, MNRAS, 514, 1441

Software Products

- ***Osaka-gadget4***. **Romano L. E. C.**, *Oku Y., Matsumoto K., Numerical Simulation Code, repository open only to collaborators (for now), due to conflicting data sharing policies*
  - *Dust grain-size evolution model (***Romano L. E. C.**, Matsumoto K.)
  - *Model for dark matter self-interactions (***Romano L. E. C.)**
  - *State-of-the-art Feedback Models (***Romano L. E. C.**, *Oku Y.)*
  - Upgrades and patches to various numerical aspects of the underlying SPH code Gadget-4 (**Romano L. E. C.**, *Oku Y., Matsumoto K.)*
- Contributed to treatment of dust physics in chemistry and cooling library **Grackle-3** (v.3.2)
  - Implemented new options for H2 and dust physics (PR #94)
  - Repository: https://github.com/grackle-project/grackle
- Fixed numerical error in publicly-available hydrodynamics code **RAMSES** (28/06/2023)
  - Fixed error related to scalar advection
  - Repository: https://bitbucket.org/rteyssie/ramses/src/master/
  - Commit **f1bd65e**

Talks & Posters

[1] *Star formation near the Sun is quenched by expansion of the Local Bubble*. **Romano L. E. C.**, *Burkert A., Behrendt M.*, Garching SN-Meeting (MPA/ESO), 24/07/2025 (invited talk)

[2] *Starburst-Driven Galactic Outflows: Unveiling the Suppressive Role of Cosmic Ray Halos.* ***Romano L. E. C.****, Owen E. R., Nagamine K., EAS 2025 Annual Meeting, Cork, 27/06/2025 (poster + 3-min pitch)*

[3] *The New Age of the Local Bubble.* ***Romano L. E. C.****, Burkert A., Behrendt M., EAS 2025 Annual Meeting, Cork, 27/06/2025 (poster + 3-min pitch)*

[4] *Starburst-Driven Galactic Outflows: Unveiling the Suppressive Role of Cosmic Ray Halos.* ***Romano L. E. C.****, Owen E. R., Nagamine K., International Workshop on Galaxy Formation, Osaka, 28/05/2025 (talk)*

[5] *SISSI: Supernovae in a Shearing, Stratified Interstellar Medium.* **Romano L. E. C.**, Behrendt M., Burkert A., iTHEMS Seminar RIKEN, Wako-shi, 23/05/2025 (invited talk)

[6] *SISSI: Supernovae in a Shearing, Stratified Interstellar Medium.* **Romano L. E. C.**, Behrendt M., Burkert A., ORIGINS PhD Days, Kufstein, 15/05/2025 (talk)

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[7] *Continuous Simulation Data Stream: A dynamical timescale-dependent output scheme for simulations.* **Romano L. E. C.**, ORIGINS Interdisciplinary Journal Club, 11/03/2025 (talk)

[8]*SISSI: Supernovae in a Shearing, Stratified Interstellar Medium.* **Romano L. E. C.**, Behrendt M., Burkert A., SESTAS Meeting MPA, Garching, 05/03/2025 (talk)

[9]*Diffusive shock acceleration of dust grains at supernova remnants.* **Romano L. E. C.**, ORIGINS Interdisciplinary Journal Club, 14/01/2025 (talk)

[10]*SISSI: Supernovae in a Shearing, Stratified Interstellar Medium.* **Romano L. E. C.**, Behrendt M., Burkert A., Osaka University Theoretical Astrophysics Colloquium, Osaka, 30/10/2024 (talk)

[11]*SISSI: Supernovae in a Shearing, Stratified Interstellar Medium.* **Romano L. E. C.**, Behrendt M., Burkert A., ORIGINS Turbulence Day 2024, Garching, 16/10/2024 (talk)

[12]*SISSI: Supernovae in a Shearing, Stratified Interstellar Medium.* **Romano L. E. C.**, Behrendt M., Burkert A., USM Science Day 2024, Munich, 12/10/2024 (5-Minute Pitch)

[13]*The Need for Dust Diffusion in SPH Simulations of Dust Evolution in the ISM.* **Romano L. E. C.**, Nagamine K., Hirashita H., Annual Meeting of the Astronomische Gesellschaft 2024, Cologne, 13/09/2024 (talk)

[14]*SISSI: Supernovae in a Shearing, Stratified Interstellar Medium.* **Romano L. E. C.**, Behrendt M., Burkert A., Annual Meeting of the Astronomische Gesellschaft 2024, Cologne, 12/09/2024 (talk)

[15]*Cloud Formation by Supernova Implosion.* **Romano L. E. C.**, Behrendt M., Burkert A., Annual Meeting of the Astronomische Gesellschaft 2024, Cologne, 10/09/2024 (poster)

[16]*Efficient formation of massive galaxies at cosmic dawn by feedback-free starbursts.* **Romano L. E. C.**, ORIGINS Interdisciplinary Journal Club, 09/07/2024 (talk)

[17]*Cloud Formation by Supernova Implosion.* **Romano L. E. C.**, Behrendt M., Burkert A., Supernova Remnants III, Chania, 09/06/2024 (poster)

[18]*Metal-Rich Star-Formation by Supernova Implosion.* **Romano L. E. C.**, Behrendt M., Burkert A., MPA Cosmology Seminar, Garching, 21/05/2024 (talk)

[19]*Metal-Rich Star-Formation by Supernova Implosion.* **Romano L. E. C.**, Behrendt M., Burkert A., ORIGINS PhD Days 2024, Grainau, 06/05/2024 (talk)

[20]*Metal-Rich Star-Formation by Supernova Remnant Implosion.* **Romano L. E. C.**, Behrendt M., Burkert A., MIAPbP: ABUNDANCE GRADIENTS IN THE LOCAL UNIVERSE (ADONIS), Garching b. München, 18/04/2024 (talk)

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[21] *Cloud Formation by Supernova Implosion.* **Romano L. E. C.**, Behrendt M., Burkert A., Building Galaxies from Scratch, Vienna, 18/02/2024 (poster)

[22] *FORGE'd in FIRE: Resolving the End of Star Formation and Structure of AGN Accretion Disks from Cosmological Initial Conditions*. **Romano L. E. C.**, ORIGINS Interdisciplinary Journal Club, 09/01/2024 (talk)

[23] *Cloud Formation by Supernova Implosion.* **Romano L. E. C.**, Behrendt M., Burkert A., ORIGINS Science Week 2023, Irsee, 05/12/2023 (talk)

[24] *Cloud Formation by Supernova Implosion.* **Romano L. E. C.**, Behrendt M., Burkert A., ORIGINS PhD Days 2023, Seeon, 28/08/2023 (talk)

[25] *SISSI: Supernovae In a Shearing, Stratified Interstellar Medium.* **Romano L. E. C.**, Behrendt M., Burkert A., Modelling Multiphase Astrophysical Systems, Kochel am See, 31/05/2023 (talk)

[26] Smallr, scalar advection errors and how to avoid them. **Romano L. E. C.**, Behrendt M., Burkert A., Ramses User Meeting 2023, Oxford University, 18/04/2023 (talk)

[27] SISSI: Supernovae In a Shearing, Stratified Interstellar Medium. **Romano L. E. C.**, Behrendt M., Burkert A., 14th IMPRS Symposium, European Space Organization, 12/05/2022 (talk)

[28] Evolution of the Grain Size Distribution and Molecular Hydrogen in SPH Simulations of an Isolated Galaxy. **Romano L. E. C.**, Nagamine K., Hirashita H., From Stars to Galaxies II, Chalmers University, 06/22/2022 (poster)

[29] *Simulating the Evolution of the Grain Size Distribution (GSD) and H2 in an isolated galaxy.* **Romano L. E. C.**, Nagamine K., Hirashita H., 13th IMPRS Symposium, Max-Planck Institute for astrophysics, 06/09/2022 (talk)

Outreach

- *Strange metal-rich stars may come from stellar implosions. Interview with writer Leah Crane for popular science article featured in Issue 31 August 2024 - New Scientist International Edition, 31/08/2024*
- *Die Urknalltheorie im Zeitalter von JWST.* **Romano L. E. C.***, PepperMINT, Gymnasium Gröbenzell, 24/10/2023 (public talk)*
- *15 Minutes about Pedestrian Dynamics.* **Romano L. E. C.**, (Ig-) Nobel prize event, 15x4 Munich, 05/19/2022 (public talk)

Workshop Organization

- **ORIGINS PhD Days 2025**, Kufstein, Austria, 3-day workshop (May 14-16 2025) with 19 participants, co-organizer: L. Meyer-Hetling
- **ORIGINS PhD Days 2024**, Grainau, Germany, 3-day workshop (May 6-8 2024) with 32 participants, co-organizers: Dr. A. Mazoun, L. Meyer-Hetling
- **ORIGINS PhD Days 2023**, Seeon, Germany, 3-day workshop (Aug. 28-30 2023) with 26 participants, co-organizer: Dr. A. Mazoun

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Awards & Scholarships

- **PhD position (01.02.2022 – 31.12.2025)** funded by the **Deutsche Forschungsgemeinschaft** (DFG, German Research Foundation) under **Germany's Excellence Strategy – EXC 2094 – 390783311**
- **PhD Representative Travel Fund 2024,** 24.05.2024, 3000 EUR, “In recognition of [...] work as a PhD representative”
- **TUM Exchange** Scholarship for an exchange Semester at Osaka University (WS 2018/2019)
- **DPG Certificate of the DPG for extraordinary achievements in the physics A-Level exam** at Gymnasium Gröbenzell (2016)

Extracurricular Activities

- **ORIGINS Interdisciplinary Jounal Club (organizer)** at ORIGINS Excellence Cluster Munich, 09/2023 – now
- **ORIGINS PhD Representative** at ORIGINS Excellence Cluster Munich, 02/2023 – now
- **Osaka University International Students Association** at Osaka University, WS 2018/2019

Hobbies

Fine Arts, Sports/Exercise, Languages, Culinary Arts

Munich, Aug 5, 2025