Elena Redaelli

Personal Data

Place and Date of Birth:	Lecco, Italy | 22 February 1992
Work Address:	Giessenbachstraße 1, 85748 Garching b. München, Germany
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Work Experience

From Sep. 2024 — ESO Garching independent fellow
European Souther Observatory

Sep 2020-*Current* — Minerva Fast-Track Research Group leader,
Max Planck Institute for Extraterrestrial Physics

Mar 2020-Sep 2020 — Post-doctoral researcher,
Max Planck Institute for Extraterrestrial Physics
Working group: Centre for Astrochemical Studies

Education

Mar 2017-Mar 2020 — PhD in Astronomy,
Max Planck Institute for Extraterrestrial Physics
Thesis: "Dynamical and chemical properties of magnetised star-forming regions"
Advisor: Prof. Paola Caselli
Defence date: 6 March 2020

Feb 2016-Oct 2016 — Master Thesis Project
Max Planck Institute for Extraterrestrial Physics
Supervisor: Prof. Paola Caselli

2014-2016 — Master Degree in Astrophysics and Cosmology,
Alma Mater University of Bologna
110/110 *Cum Laude*
Thesis: "Interstellar ammonia emission: unveiling the dynamics of a star-forming core"
Advisor: Prof. Andrea Cimatti

2011-2014 — Bachelor Degree in Physics,
Alma Mater University of Bologna
110/110 *Cum Laude*
Thesis: "Bose-Einstein condensation in optical traps"
Advisor: Prof. Fabio Ortolani

Scientific Interests

- Low-mass and high-mass star formation;
- Molecular spectroscopy at centimetre, millimetre, and sub-millimetre wavelengths;
- Continuum observation of dust thermal emission
- LTE and non-LTE radiative transfer analysis (usign e.g. RADEX, POLARIS, MOLLIE);
- Molecular fractionation and chemical modelling;
- Polarimetry (at NIR/FIR/sub-mm wavelengths) and magnetic field properties;
- single-dish and interferometric observations.

Publication Summary

I am involved in 38 refereed publications (11 as first-author papers), published in the main journals in the astrophysics field. My publications collected so far $\approx$ 740 citations. Of these, $\approx$ 20% come from first-author papers. My current Hirsch index is 16. My complete publication list is available at https://ui.adsabs.harvard.edu/public-libraries/nE7oNB14TWa_m1kMTEBfDQ.

Research Leadership Highlights

My current position is leader of a junior research group, funded through the Minerva Fast-Track scheme by the Max-Planck Society. The position is addressed to outstanding female scientists right after the completion of their doctoral program, and it is highly competitive, with only a couple of positions awarded every year among all the Max Planck Institutes in the Chemical, Physical, and Technical Section. In my group I hired two Ph.D. students, whom I co-supervise together with the director of my group, Prof. Dr. Paola Caselli. In particular, I am in charge of their research projects. As the main PI of the ALMA Large Program UNIC, I am in charge of coordinating a worldwide team of $\sim$ 30 scientists.

Fellowships, Awards, and Achievements

Nov 2021	Fundings from the program ESO-MIXTO (application submitted with Prof. S. Bovino) Aim: six-weeks visit to several Chilean institutions (*4'000 eur*)
Apr 2021	Otto-Hahn Medal awarded by the Max Planck Society to its best Ph.D. graduates (*7'500 eur*)
Dec 2020	Minerva fast-track fellowship awarded by the Max Planck Society ($\approx$ *180'000 eur*)
Jun 2018	Best Talk Award, International Conf. for young Astronomers and Astrophysicists
Jun 2015	Scholarship to perform the master thesis project in a foreign institution, given by Alma Mater University of Bologna (*2'000 eur*)
2013-2015	Three times winner of the award given on merit basis to students of science department, Alma Mater University of Bologna ($\approx$ *3'000 eur in total*)

Selected Conference Contributions and Seminars

Sep 2023	Invited participant to Core2diskIII, Paris Saclay, France (**invited review talk**)
Sep 2023	II Congresso di astrochimica (proto-)planetaria,Trieste, Italy (**contributed talk**)
Jan 2023	Seminar at astronomy department, KU Leuven, Belgium (**invited seminar**)
Jan 2023	Science with the Atacama Pathfinder Experiment (APEX), Tegernsee, Germany (**contributed talk**)
Nov 2022	Cosmic Rays 2, Florence, Italy (**contributed talk**)
Oct 2022	Seminar at astronomy department, Universidad de Chile, Santiago, Chile (**invited seminar**)

Oct 2022	Seminar at astronomy department, Pontificia Universidad Católica, Santiago, Chile (**invited seminar**)
Sep 2022	Seminar at astronomy department, Universidad de Concepción, Chile (**invited seminar**)
Jun 2022	EAS - Annual meeting of the European Astronomical Society, Valencia, (**contributed talk**)
Mar 2022	MAYA - Meeting of ALMA Young Astronomers, (**online talk**)
Jul 2021	Astrochemical Frontiers — Quarantine Edition 2 (**online talk**)
Jun 2021	Astronomische Gesellschaft Annual Meeting (**invited talk**)
Jun 2020	Astrochemical Frontiers — Quarantine Edition, (**online talk**)
Mar 2020	SOFIA Community Tele-Talk Series, (**online talk**)
Oct 2019	Institute of RadioAstronomy (IRA) Seminar, Bologna, Italy (**seminar**)
Sep 2019	Astronomische Gesellschaft Annual Meeting, Stuttgart, Germany (**contributed talk**)
Aug 2019	YERAC, Dublin, Ireland (**contributed talk**)
Jun 2019	Star and Planet Formation Seminar, ESO, Garching, Germany (**contributed talk**)
Jan 2019	SOFIA workshop2019, Ringberg Castle, Germany (**contributed talk**)
Sep 2018	Chalmers Jubilee Professor Workshop on Fractionation, Astrochemistry and Star/Planet formation, Göteborg, Sweden (**tcontributed alk**)
Jun 2018	International Conf. for young Astronomers and Astrophysicists, Padoa, Italy (**invited talk**)
Sep 2017	Star Formation Seminar, Arcetri, Italy (**seminar**)

Observing Experience

For my research, I work with all the main available facilities in the FIR/mm regime, such as:

- IRAM 30m telescope (observations both visiting and remote, > 150h),
- Green Bank Telescope (GBT, observations both visiting and remote, > 30h),
- Atacama Pathfinder EXperiment (APEX),
- Stratospheric Observatory for Infrared Astronomy (SOFIA),
- Atacama Large Millimetre and sub-millemetre Array (ALMA),
- Very Large Array (VLA),
- Large Millimeter Telescope (LMT),
- Effelsberg 100m radio telescope.

Selection of Accepted Observing Proposals as PI

2023	13) *UNveiling the Initial Condition of high-mass star formation (UNIC)* , facility: ALMA Large Program; Awarded time: 81h (main array), >900h (ACA)
	12) *Cosmic rays in dense cores*, facility: APEX; Awarded time: 35h
2022	11) *A crucial test for the mass of prestellar cores in a high-mass clump*, facility: VLA and GBT; Awarded time: 13h (VLA) + 2h (GBT)
2021	10) *Cosmic-ray ionisation rate in prestellar cores*, facility: IRAM 30m; Awarded time: 14h
	9) *Unveiling the kinematics of the large-scale envelope in L1544*, facility: IRAM 30m; Awarded time: 14h
2020	8) *A deeper look to the magnetic properties of IRAS 15398-3359*, facility: SOFIA; Awarded time: 8h
2019	7) *The kinematics of a magnetised protostellar core*, facility: APEX; Awarded time: 16h
	6) *The* ^{14}N/^{15}N *ratio in low-mass protostars: a new step towards understanding N-chemistry*, facility: IRAM 30m; Awarded time: 37h

2018 5) *Casting light on nitrogen chemistry*,
facility: GBT; Awarded time: 8h
4) *Unveiling the kinematics of a protocluster at high densities*,
facility: APEX; Awarded time: 14h
3) *The spatial distribution of* $N^{15}NH^+$*: the next step to unveil the chemistry of* ^{15}N *fractionation*,
facility: IRAM 30m; Awarded time: 55h
2) *Tracing ambipolar diffusion in a protostellar clump*,
facility: IRAM 30m; Awarded time: 20h
2017 1) *Polarimetry in B228*,
facility: SOFIA; Awarded time: 3h

Selection of Accepted Observing Proposals as co-I

2023 9) *Estimating the cosmic-ray ionisation rate across OMC-2 and OMC-3*
facility: ALMA; PI: A. Socci
2022 8) *Zooming in the stellar cradle. The chemistry and physics of a pre-stellar core at high-angular resolution*, facility: NOEMA; PI: S. Spezzano
7) *Hunting prestellar cores in high-mass star-forming regions: a comparison between o-*H_2D^+ *and* N_2D^+, facility: ALMA; PI: S. Bovino
2021 6) *Unveiling the distribution of the cosmic-rays ionization rate with ALMA*,
facility: ALMA; PI: G. Sabatini
5) *Pilot study of para-*D_2H^+ *in a high-mass clump with ALMA*,
facility: ALMA; PI: S. Bovino
2020 4) *Disentangling filaments in TMC-1*,
facility: VLA; PI: R. Friesen
3) *Tracing Ambipolar Diffusion in a Protostellar Clump*
facility: LMT; PI: C. Román-Zuñiga
2019 2) *The first steps of interstellar phosphorus chemistry*,
facility: Effelsberg; PI: J. Chantzos
2017 1) *Are dense cores in Orion A bound? A crucial test*,
facility: VLA; PI: J. E. Pineda

Teaching and Mentoring Experience

Sep 2022 Two workshops on *The CLASS/GILDAS software* as part of the Master program at Universidad de Concepción, Chile
2022-*Current* Member of the Ph.D. thesis committee of Marta Obolentseva (MPE)
2021-*Current* Lectures within the course *Introduction to Astrophysics*, master level (led by P.D. Dr. Eisenhauer, Technische Universität München)
2021-*Current* **Supervision of Ph.D. student Farideh S. Tabatabaei**
Thesis: *Kinematics and magnetic fields in low-mass star-forming regions*
2021-*Current* **Supervision of Ph.D. student Wiebke Riedel**
Thesis: *Deuterated complex organic molecules: a theoretical and observational study*
2020-*Current* Member of the Ph.D. thesis committee of Judit Ferrer (MPE)
2018 Co-supervision of Master student
Gloria Angeletti (from Alma Mater University of Bologna)
2017 Co-supervision of Bachelor student
Judit Ferrer (from Universitat Autònoma de Barcelona)

Additional Research Experience

Sep 2023	Waitlisted for Max Planck Independent Research Group Position
2023-*Current*	Expert panel member for the Observing Programmes Committee (OPC), Panel C, Periods 113-114, European Southern Observatory
2023-*Current*	Member of COST Action CA22133 – The birth of solar systems (PLANETS)
2023-*Current*	Member of the SKA Working Group Cradle of Life
Jul 2023	Shortlisted for Associate Professor position, Argelander Institute for Astronomy, Bonn University (this position will be declined if the ISTA application is successful)
2019-*Current*	Referee for ApJ, MNRAS, Astronomy&Astrophysics
2017-*Current*	Member of the GBT Ammonia Survey (GAS – PI: Friesen & Pineda), a legacy survey performed with the Green Bank Telescope to map the NH_3 transitions toward all the northern Gould Belt star forming regions.
2017-2020	IMPRS PhD representative, involved in organising scientific and social activities

Outreach

Feb 2023	Physikerin der Woche 2023, from the German Physical Society
2023-*Current*	Regularly involved in outreach events with high-school classes visiting MPE
Apr 2023	Invited speaker from the Astrophile Group Deepspace, Lecco, Italy
2018	Speaker for an event encouraging high-school girls towards STEM careers, Lecco, Italy
2017-*Current*	Involved in science-related events in my former high school, Lecco, Italy
2017-*Current*	Involvement in outreach events organised by MPE (e.g. open days)

Publication List

First Author Articles

11. *Testing analytical methods to derive the cosmic-ray ionisation rate in cold regions via synthetic observations*
Redaelli, E., Bovino, S., Lupi, A., Grassi, T., Gaete-Espinoza, D., Sabatini, G., Caselli, P,
Accepted for publication in A&A. doi: 10.48550/arXiv.2402.10852

10. *Nitrogen fractionation in ammonia and its insights into nitrogen chemistry*
Redaelli, E., Bizzocchi, L., Caselli, P., and Pineda, J. E.
A&A, 674, L8. doi: 10.1051/0004-6361/202346647
cited 3

9. *A large ($\sim 1\,pc$) contracting envelope around the prestellar core L1544*
Redaelli, E., Chacón-Tanarro, A., Caselli, P., Tafalla, M., Pineda, J. E., Spezzano, S., and O. Sipilä
ApJ, 941, 168, 2022. doi:10.3847/1538-4357/ac9d8b
cited 6

8. *The Core Population and Kinematics of a Massive Clump at Early Stages: An Atacama Large Millimeter/submillimeter Array View*
Redaelli, E., Bovino, S., Sanhueza, P., Morii, K., Sabatini, G. Caselli, P., Giannetti, A., et al.
ApJ, 936, 169, 2022. doi:10.3847/1538-4357/ac85b4
cited 14

7. *The cosmic-ray ionisation rate in the pre-stellar core L1544*
Redaelli, E., Sipilä, O., Padovani, M., Caselli, P., Galli, D., and Ivlev, A. V.
A&A, 656, A109, 2021. doi:10.1051/0004-6361/ 202141776
cited 20

6. *Identification of pre-stellar cores in high-mass star forming clumps via* H_2D^+ *observations with ALMA*
Redaelli, E., Bovino, S., Giannetti, A., Sabatini, G., Caselli, P., Wyrowski, F., et al.
A&A, 650, A202, 2021. doi:10.1051/0004-6361/202140694
cited 17

5. *First sample of* N_2H^+ *nitrogen isotopic ratio measurements in low-mass protostars*
Redaelli, E., Bizzocchi, L., and Caselli, P.
A&A, 644, A29, 2020. doi:10.1051/0004-6361/202039303
cited 5

4. *Magnetic properties of the protostellar core IRAS 15398-3359*
Redaelli, E., Alves, F. O., Santos, F. P., and Caselli, P.
A&A, 631, A154, 2019. doi:10.1051/0004-6361/201936271
cited 17

3. *High sensitivity maps of molecular ions in L1544: I. Deuteration of* N_2H^+ *and* HCO^+ *and first evidence of* N_2D^+ *depletion*
Redaelli, E., Bizzocchi, L., Caselli, P., Sipilä, O., Lattanzi, V., Giuliano, B. M., and Spezzano, S.
A&A, 629, A15, 2019. doi: 10.1051/0004-6361/201935314
cited 48

2. $^{14}N/^{15}N$ *ratio measurements in prestellar cores with* N_2H^+*: New evidence of* ^{15}N*-antifractionation*
Redaelli, E., Bizzocchi, L., Caselli, P., Harju, J., Chacón-Tanarro, A., Leonardo, E., and Dore, L.

A&A, 617, A7, 2018. doi: 10.1051/0004-6361/201833065.
cited 31

1. *The Green Bank Ammonia Survey: Unveiling the dynamics of the Barnard 59 star-forming clump.*
Redaelli, E., Alves, F. O., Caselli, P., Pineda, J. E., Friesen, R. K., Chacón-Tanarro, A., et al.
ApJ, 850, 202, 2017. doi: 10.3847/1538-4357/aa9703.
cited 11

Major Contributions

12. *Fractionation in young cores: direct determinations of nitrogen and carbon fractionation in HCN*
Jensen, S. S., Spezzano, S., Caselli, P., Sipilä, O., **Redaelli, E.**, Giers, K., Ferrer Asensio, J.
Accepted for publication in A&A. doi: 10.48550/arXiv.2403.04408

11. *Modelling Deuterated Isotopologues of Methanol toward the Pre-Stellar Core L1544*
Riedel, W., Sipilä, O., **Redaelli, E.**, Caselli, P., Vasyunin, A. I., Dulieu, F., Watanabe, N.
A&A, 680, A87, 2023. doi: 10.1051/0004-6361/202245367
cited 1

10. *Similar levels of deuteration in the pre-stellar core L1544 and the protostellar core HH211*
Giers, K, Spezzano, S., Caselli, P., Wirström, E, Sipilä, O., Pineda, J. E., **Redaelli, E.**, Bop, C. T., and Lique, F.
A&A, 676, A78, 2023. doi: 10.1051/0004-6361/202346433
cited 2

9. *First ALMA Maps of Cosmic-Ray Ionization Rate in High-mass Star-forming Regions*
Sabatini, G., Bovino, S., **Redaelli, E.**, ApJ, 947, L18. doi:10.3847/2041-8213/acc940
cited 7

8. *The kinematics of the magnetised protostellar core IRAS15398-3359*
Tabatabaei, F. S., **Redaelli, E.**, Caselli, P., Alves, F. O., 2023
A&A, 672, A72, 2023. doi: 10.1051/0004-6361/202244861

7. *Chemistry and dynamics of the prestellar core L1544*
Sipilä, O., Caselli, P., **Redaelli, E.**, and Spezzano, S.
A&A, 668, A131, 2022. doi:10.1051/0004-6361/202243935
cited 5

6. *Tracing the contraction of the pre-stellar core L1544 with* $HC^{17}O^+$ $J = 1 - 0$ *emission*
Ferrer Asensio, J., Spezzano, S., Caselli, P., Alves, F. O., Sipilä, O., **Redaelli, E.**, et al.
A&A, 667, A119, 2022. doi:10.1051/0004-6361/202243927
cited 2

5. *Deuteration of c-C_3H_2 towards the pre-stellar core L1544*
Giers, K., Spezzano, S., Alves, F. O., Caselli, P., **Redaelli, E.**, Sipilä, O, et al.
A&A, 664, A119, 2022. doi:10.1051/0004-6361/202243422
cited 6

4. *The Central 1000 au of a Pre-stellar Core Revealed with ALMA. II. Almost Complete Freeze-out*
Caselli, P., Pineda, J. E., Sipilä, O., Zhao, B., **Redaelli, E.**, Spezzano, S., et al.
ApJ, 929, 13, 2022. doi:10.3847/1538-4357/ac5913
cited 37

3. *First survey of* $HCNH^+$ *in high-mass star-forming cloud cores*
Fontani, F., Colzi, L., **Redaelli, E.**, Sipilä, O., and Caselli, P.

A&A, 651, A94, 2021. doi:10.1051/0004-6361/202140655
cited 9

2. *The first steps of interstellar phosphorus chemistry*
Chantzos, J., Rivilla, V. M., Vasyunin, A., **Redaelli, E.**, Bizzocchi, L., Fontani, F., and Caselli, P.
A&A, 633, A54, 2020. doi:10.1051/0004-6361/201936531
cited 28

1. *Why does ammonia not freeze out in the centre of pre-stellar cores?*
Sipilä, O., Caselli, P., **Redaelli, E.**, Juvela, M., and Bizzocchi, L.
MNRAS, 487, 1269, 2019. doi: 10.1093/mnras/stz1344.
cited 34

Minor Contributions

15. *Nuclear spin ratios of deuterated ammonia in prestellar cores LAsMA observations of H-MM1 and Oph D*
Harju, J., Pineda, J. E., Sipilä, O., Caselli, P., Belloche, A., Wyrowski, F., Riedel, W., **Redaelli, E.**, Vasyunin, A. I.
A&A, 682, A8, 2024. doi: 10.1051/0004-6361/202346578

14. *Alignment of dense molecular core morphology and velocity gradients with ambient magnetic fields*
Pandhi, A., Friesen, R. K., Fissel, L., Pineda, J. E., Caselli, P., Chen, M. C. -Y., Di Francesco, J., Ginsburg, A., Kirk, H., Myers, P. C., Offner, S. S. R., Punanova, A., Quan, F., **Redaelli, E.**, et al.
MNRAS, 525, 1, 2023. doi: 10.1093/mnras/stad2283
cited 3

13. *The ALMA Survey of 70 μm Dark High-mass Clumps in Early Stages (ASHES). VI. The core-scale CO-depletion*
Sabatini, G., Bovino, S., Sanhueza, P., Morii, K., Li, S., **Redaelli, E.**, et al.
ApJ, 936, 80, 2022. doi:10.3847/1538-4357/ac83aa
cited 12

12. *Transition from Coherent Cores to Surrounding Cloud in L1688*
Choudhury, S., Pineda, J. E., Caselli, P., Offner, S. S. R., [...] **Redaelli, E.**, et al.
A&A, 648, A114, 2021. doi:10.1051/0004-6361/202039897
cited 12

11. *Are Massive Dense Clumps Truly Subvirial? A New Analysis Using Gould Belt Ammonia Data*
Singh A., Matzner C. D., Friesen R. K., Martin P. G., Pineda J. E., Rosolowsky E., Alves F.., [...], **Redaelli, E.**, et al., 2021, ApJ, 922, 87. doi:10.3847/1538-4357/ac20d2
cited 18

10. *First detection of NHD and ND_2 in the interstellar medium*
Melosso, M., Bizzocchi L., Sipilä, O., Giuliano, B. M., [...], **Redaelli, E.**, Caselli, P.
A&A, 641, A153, 2020. doi:10.1051/0004-6361/202038490
cited 14

9. *Ubiquitous NH_3 supersonic component in L1688 coherent cores*
Choudhury, S., Pineda J. E., Caselli, P., Ginsburg, A., Offner, S. S. R., [...], **Redaelli, E.**, et al.
A&A640, L6, 2020. doi: 10.1051/0004-6361/202037955
cited 11

8. *Relative alignment between dense molecular cores and ambient magnetic field: the synergy of numerical models and observations*
Chen C.-Y., Behrens E. A., Washington J. E., Fissel L. M., [...], **Redaelli, E.**, Caselli, P., et al.
MNRAS, 494, 1971, 2020. doi: 10.1093/mnras/staa835
cited 13

7. *Velocity-coherent filaments in NGC 1333: evidence for accretion flow?*
Chen, M. C.-Y., Di Francesco, J., Rosolowsky, E., Keown, J., [...], **Redaelli, E.,** et al.
ApJ, 891, 84, 2020. doi: 10.3847/1538-4357/ab7378
cited 36

6. *The chemical structure of the very young starless core L1521E*
Nagy, Z., Spezzano, S., Caselli, P., Vasyunin, A., Tafalla, M., [...], **Redaelli, E.**,
A&A, 630, A136, 2019. doi: 10.1051/0004-6361/201935568
cited 22

5. *Droplets. I. Pressure-dominated coherent structures in L1688 and B18*
Chen, H. H.-H., Pineda, J. E., Goodman, A. A., Burkert, A., Offner, [...], **Redaelli, E.**, and GAS Collaboration,
ApJ, 877, 93, 2019. doi: 10.3847/1538-4357/ab1a40.
cited 51

4. *The Green Bank Ammonia Survey: A Virial Analysis of Gould Belt Clouds in Data Release 1*
Kerr, R., Kirk, H., Di Francesco, J., Keown, J., Chen, M., [...], **Redaelli, E.**, et al.
ApJ, 874(2), 147, 2019. doi: 10.3847/1538-4357/ab0c08
cited 20

3. *The Green Bank Ammonia Survey: Observations of hierarchical dense gas structures in Cepheus-L1251*
Keown, J., Di Francesco, J., Kirk, H., Friesen, R. K., [...], **Redaelli, E.**, et al.
ApJ, 850, 3, 2017. doi: 10.3847/1538-4357/aa93ec
cited 22

2. *The Green Bank Ammonia Survey: Dense cores under pressure in Orion A*
Kirk H., Friesen R. K., Pineda J. E., Rosolowsky E., Offner S. S. R., [...], **Redaelli, E.**
ApJ, 846, 144, 2017. doi: 10.3847/1538-4357/aa8631
cited 68

1. *The Green Bank Ammonia Survey: First results of NH3 mapping of the Gould Belt*
Friesen, R. K., Pineda, J. E., co-PIs, Rosolowsky, E., [...], **Redaelli, E.**, and GAS Collaboration
ApJ, 843, 63, 2017. doi: 10.3847/1538-4357/aa6d58
cited 132

Proceedings

3. *The Core Population and Kinematics of a Massive Clump: An ALMA View of AG14.49*
Redaelli, E., Bovino, S., Sanhueza, P., and Caselli, P. In Proceedings of the 7th Chile-Cologne-Bonn-Symposium, Universitäts- und Stadtbibliothek Köln, Feb 2023. doi: 10.18716/kups/64624

2. *Molecules in space: The analysis of the protostellar clump Barnard 59.*
E. Redaelli, F. O. Alves, P. Caselli, J. E. Pineda, and GAS Survey. In American Institute of Physics Conference Series, volume 2032 of American Institute of Physics Conference Series, page 020005, Oct 2018a. doi: 10.1063/1.5067264

1. *The dynamics of a young protostellar core.*
E. Redaelli, F. O. Alves, P. Caselli, J. E. Pineda, and GAS Team. Mem. Soc. Astron. Italiana, 88:810, Jan 2017b.