# Sam de Regt

PhD Candidate in Astronomy

Einsteinweg 55, 2333 CC Leiden, NL
regt@strw.leidenuniv.nl | samderegt.github.io

## Education

**PhD in Astronomy, Leiden Observatory, NL** **Sep 2022 - Present**

- Thesis: *Isotope ratios of exoplanets and brown dwarfs*
  Advisor: Prof. Dr. Ignas Snellen

**MSc Astronomy, Leiden Observatory, NL** **Sep 2020 - Aug 2022**

- 2nd Thesis: *Polarimetric differential imaging with VLT/NACO* Grade: 9.5/10
  Advisors: Dr. Matthew Kenworthy & Dr. Christian Ginski
- 1st Thesis: *An assessment of the VO line list & a non-detection of VO in the atmosphere of WASP-121b* Grade: 9.0/10
  Advisors: Prof. Dr. Ignas Snellen & Dr. Aurora Kesseli

**BSc Astronomy, Leiden Observatory, NL** **Sep 2017 - Aug 2020**

- Thesis: *Colour-magnitude diagrams of the Magellanic Clouds* Grade: 8.5/10
  Advisor: Dr. Anthony Brown

## Publications

### Major Contributions

1. Gandhi, S., **de Regt, S.**, Snellen, I. A. G., Palma-Bifani, P., Abdoulwahab, I., Chauvin, G., González Picos, D., Zhang, Y., Landman, R., Stolker, T., Kesseli, A. Y., Mulder, W., Chomez, A., Lagrange, A. M., Zurlo, A. (2025). *The ESO SupJup Survey. V. Exploring Atmospheric Variability and Orbit of the Super-Jupiter AB Pictoris b with CRIRES+*. Accepted for publication in MNRAS.
2. **de Regt, S.**, Gandhi, S., Snellen, I. A. G., Zhang, Y., Ginski, C., González Picos, D., Kesseli, A. Y., Landman, R., Mollière, P., Nasedkin, E., Sánchez-López, A., Stolker, T. (2024). *The ESO SupJup Survey. I. Chemical and isotopic characterisation of the late L-dwarf DENIS J0255-4700 with CRIRES$^+$*. A&A, 688, A116.
3. **de Regt, S.**, Ginski, C., Kenworthy, M. A., Caceres, C., Garufi, A., Gledhill, T. M., Hales, A. S., Huelamo, N., Kóspál, Á., Millar-Blanchaer, M. A., Pérez, S., Schreiber, M. R. (2024) *Polarimetric differential imaging with VLT/NACO. A comprehensive PDI pipeline for NACO data (PIPPIN)*. A&A, 684, A73.
4. Gandhi, S., **de Regt, S.**, Snellen, I. A. G., Zhang, Y., Rugers, B., van Leur, N., Bosschaart, Q. (2023). *JWST Measurements of $^{13}C$, $^{18}O$, and $^{17}O$ in the Atmosphere of Super-Jupiter VHS 1256 b*. ApJ, 957, L36.

5. **de Regt, S.**, Kesseli, A. Y., Snellen, I. A. G., Merritt, S. R., Chubb, K. L. (2022). *A quantitative assessment of the VO line list: Inaccuracies hamper high-resolution VO detections in exoplanet atmospheres*. A&A, 661, A109.

### Minor Contributions

1. Siebenaler, L., Miguel, Y., and **de Regt, S.**, Guillot, T. (2025). *Conditions for radiative zones in the molecular hydrogen envelope of Jupiter and Saturn: The role of alkali metals*. Accepted for publication in A&A.
2. González Picos, D., Snellen, I. A. G., **de Regt, S.**, Landman, R., Zhang, Y., Gandhi, S., Sánchez-López, A. (2025). *The ESO SupJup Survey. IV. Unveiling the carbon isotope ratio of GQ Lup B and its host star*. Accepted for publication in A&A.
3. Zhang, Y., González Picos, D., **de Regt, S.**, Snellen, I. A. G., Gandhi, S., Ginski, C., Kesseli, A. Y., Landman, R., Mollière, P., Nasedkin, E., Sánchez-López, A., Stolker, T., Inglis, J., Knutson, H. A., Mawet, D., Wallack, N., Xuan, J. W. (2024). *The ESO SupJup Survey. III. Confirmation of $^{13}$CO in YSES 1 b and Atmospheric Detection of YSES 1 c with CRIRES$^+$*. AJ, 168, 246.
4. González Picos, D., Snellen, I. A. G., **de Regt, S.**, Landman, R., Zhang, Y., Gandhi, S., Ginski, C., Kesseli, A. Y., Mollière, P., Stolker, T. (2024). *The ESO SupJup Survey: II. The $^{12}C/^{13}C$ isotope ratios of three young brown dwarfs with CRIRES$^+$*. A&A, 689, A212.
5. Landman, R., Stolker, T., Snellen, I. A. G., Costes, J., **de Regt, S.**, Zhang, Y., Gandhi, S., Molliere, P., Kesseli, A., Vigan, A., Sanchez-López, A. (2024). *$\beta$ Pictoris b through the eyes of the upgraded CRIRES+. Atmospheric composition, spin rotation, and radial velocity*. A&A, 682, A48.

## Presentations

### Contributed Talks

1. Two HoRSEs: Berlin, DE (July 2024). *Double delight: CRIRES+ insights into the nearest brown dwarf binary*
2. Exoplanets 5: Leiden, NL (June 2024). *Double delight: CRIRES+ exploration of Luhman 16's binary atmospheres*
3. petitRADTRANS workshop: Heidelberg, DE (Nov 2023). *Characterising the atmosphere of a late L-dwarf with CRIRES+*
4. NOVA fall school: Dwingeloo, NL (Nov 2023). *Characterising the atmosphere of a late L-dwarf with CRIRES+*
5. Exoplanets by the Lake: Starnberg, DE (Aug 2023). *Characterising a brown dwarf's atmosphere with CRIRES+*

### Posters

1. Sagan Workshop: Pasadena, US (July 2023). *First results from the ESO SupJup Survey: Detection of chemical dis-equilibrium in brown dwarf DENIS J0255's atmosphere*

## Teaching & Supervision

### Teaching Assistant

– *Astronomy Lab & Observing Project* Sep 2022 - June 2025
A 2nd-year BSc. course, where my tasks include assistance at problem classes, the supervision of student research projects and their observations.

### Research Supervision

– MSc. Quincy Bosschaart Oct 2022 - July 2023
1st Thesis: *The $^{12}CO/^{13}CO$ isotopologue ratio of VHS 1256-1257b*

– MSc. Charlotte Coone Oct 2023 - July 2024
1st Thesis: *Probing the Atmosphere of mid-L dwarf LSPM J0036+1821 using multi-wavelength CRIRES$^+$ spectra*

– MSc. Dion Cobelens Feb 2024 - Dec 2024
1st Thesis: *A Tale of Two Carbons: Exploring Isotopic Ratios, Atmospheric Composition, and the Formation Environment of PZ Tel B*

## Tools & Software

– PIPPIN (**P**DI **pip**eli**n**e for **N**ACO data): A python data reduction pipeline to apply the Polarimetric Differential Imaging (PDI) technique to VLT/NACO observations, as described in de Regt et al. (2024). The package can be found on (PyPi | GitHub) and reduced data products are available on Zenodo.

## Other Experience

**Exoplanet Group Meeting**: Co-organising Leiden's weekly meeting since 2022.

### Observing Experience

– 4 nights (Nov 2022) at the Very Large Telescope, using CRIRES+ to observe brown dwarfs and exoplanets as part of the ESO SupJup Survey.
– 8 nights (2023, 2024) at the Isaac Newton Telescope (La Palma), using the Wide Field Camera. My tasks included assisting students with their observing projects and the telescope operation.

### Other publications

– NOVA press release (Apr 2024): *Student cleans up archival data and uncovers two stellar cocoons*
– Student article in Nederlands Tijdschrift voor Natuurkunde (Aug 2024): *Planeetvormende schijven in beeld*

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