

Aayush Alpesh Desai

Curriculum Vitae

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Profile

PhD researcher in astrophysics at the Institute of Science and Technology Austria (ISTA), studying magnetic white dwarfs and compact stellar remnants. Research combines optical, ultraviolet, X-ray, and time-domain observations with statistical analysis and numerical modelling to investigate stellar evolution and accretion phenomena.

Education

- 2023–Present **PhD in Astrophysics**, *Institute of Science and Technology Austria (ISTA)*, Austria.
2020–2023 **Bachelor of Science in Physics**, *Lund University*, Sweden.

Research Experience

- Sep. **PhD Researcher**, *Institute of Science and Technology Austria (ISTA)*, Austria.
2023–Present
 - Study magnetic white dwarfs, with an emphasis on rapidly rotating merger remnants.
 - Analyse optical, ultraviolet, and X-ray observations together with numerical modelling to investigate magnetic white dwarfs and compact stellar merger remnants.

Apr. **Research Intern in Asteroseismology**, *Institute of Science and Technology Austria (ISTA)*, Austria.
2023–Aug. 2023
 - Estimated global asteroseismic parameters using power-spectral-density inversions in a Bayesian framework.

Sep. **Bachelor's Thesis: Galactic Motion of the Sun**, *Lund University*, Sweden.
2022–Jan. 2023
 - Measured the circular velocity of the Sun using Gaia Data Release 3.

Feb. **Deep Learning for High-Energy Physics**, *Lund University*, Sweden.
2022–Jun. 2023
 - Applied deep neural networks to experimental simulations for energy reconstruction.

Feb. **Quantum Emitters in Optical Microcavities**, *Leiden University*, Netherlands.
2022–Jun. 2022
 - Characterised and controlled micrometre-scale optical microcavities and studied single-emitter light–matter interactions.

Jun. **Photoionisation of the Carbon II Ion**, *Lund University*, Sweden.
2021–Sep. 2021
 - Studied Carbon II photoionisation using the R-matrix method.
 - Results are documented in a [technical report](#).

Jun. **Beamline for Schools (BL4S)**, *CERN*, Switzerland.
2018–Jun. 2019
 - Won CERN's [Beamline for Schools](#) competition as part of the Cryptic Ontics team.
 - Conducted the [proposed experiment](#) at CERN; results were published in *The Physics Educator*.

Invited Talks

- 31 Jan. 2025 **Pizza Seminar**, *University of Vienna*, Austria.
“Trust but Verify: Gradients”

Peer-Reviewed Publications

- 2026 **A. Desai** et al., "Circumstellar interaction in the extreme white dwarf merger remnant ZTF J1901+1458: A new class of white dwarf merger remnants with X-ray emission," *Astronomy & Astrophysics*, published online 7 July 2026. [doi:10.1051/0004-6361/202557035](https://doi.org/10.1051/0004-6361/202557035).
- 2026 A. Torralba et al. (including **A. Desai**), "A Black Hole Star at Cosmic Noon: Extreme Balmer Break, Photospheric Continuum, and Broad Absorption by Thick Winds in a Little Red Dot at $z = 1.7$," *The Astrophysical Journal Letters*, 1005(2), L37. [doi:10.3847/2041-8213/ae7bfd](https://doi.org/10.3847/2041-8213/ae7bfd).
- 2026 B. R. B. Liagre, **A. Desai**, L. Einramhof, and L. Bugnet, "Near-degeneracy effects in quadrupolar mixed modes," *Astronomy & Astrophysics*, 707, A321. [doi:10.1051/0004-6361/202558023](https://doi.org/10.1051/0004-6361/202558023).
- 2026 A. A. Cristea et al. (including **A. Desai**), "A half ring of ionized circumstellar material trapped in the magnetosphere of a white dwarf merger remnant," *Astronomy & Astrophysics*, 706, A188. [doi:10.1051/0004-6361/202556432](https://doi.org/10.1051/0004-6361/202556432).
- 2025 M. Zu, **A. Desai**, and C. P. Goodrich, "Fully Independent Response in Disordered Solids," *Physical Review Letters*, 134(23), 238201. [doi:10.1103/PhysRevLett.134.238201](https://doi.org/10.1103/PhysRevLett.134.238201).
- 2020 S. Chatterji et al. (including **A. Desai**), "A Highschooler's Guide to GeV-Range Electromagnetism," *The Physics Educator*, 2(3), 2050013. [doi:10.1142/S2661339520500134](https://doi.org/10.1142/S2661339520500134).
- A complete publication list is attached as a separate document.

Selected Achievements and Awards

- Dec. 2021 **Erasmus+ Traineeship Grant**, *Erasmus+*.
Awarded for a research internship at Leiden University.
- Oct. 2018 **Recognition from the Department of Atomic Energy**, *Government of India*.
Felicited by K. N. Vyas, Chairman of the Bhabha Atomic Research Centre, for representing India at CERN's Beamline for Schools competition.
- Jun. 2017 **Sakura Science Program**, *Japan Science and Technology Agency (JST)*.
Represented India during a 15-day scientific exchange visit to Japan.

Technical Skills

- Programming Python (advanced); C/C++ and Fortran (intermediate)
- Tools Git, $\LaTeX$, Anaconda, Numba, GitHub, and Microsoft Office
- Languages English (C2), Hindi, and Gujarati