

EXWINGS Workshop

18-20 September 2024
Uppsala, Sweden



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Timetable

Timetable overview

The workshop will take place at the [Ångström Laboratory](#) in Uppsala, Sweden. Sessions will be held in various rooms, as indicated in the table below. You can click on each room number to access the campus map, which shows the exact location of each meeting room. We have attempted to organise the sessions to allow cohesive scientific discussions. Each presentation will be a contributed talk (CT) lasting 15 minutes, which may include time for questions. Any further questions or discussion points can be addressed during the dedicated discussion sessions following the talks.

Wednesday's catered lunch, all fika breaks, and the workshop dinner are included. For Thursday and Friday, lunch can be purchased at one of two campus restaurants: Rullan or Café Ångström. We recommend Rullan, located on the ground floor of the main building (House 10), where seats will be reserved for workshop participants. We will have our workshop dinner at [Katalin](#) on Thursday evening, which is located conveniently near the central train station.

Day	Session	Time	Location
Wednesday 18th Sept.	Introduction	11:00–12:10	80127
	Inner region	14:15–17:00	80109
Thursday 19th Sept.	Resolved structures	09:15–12:15	80101
	UU Seminar	14:00–15:00	90102
	Microphysics	15:15–17:00	90103
Friday 20th Sept.	Circumstellar environment	09:15–10:00	101127
		10:15–12:15	101190
	General discussion	14:00–16:00	11137

Wednesday, 18th of September

11:15–11:25	Welcome remarks		
11:25–11:50	Participants introduce themselves		
12:10–14:00	Catered lunch		
Session 1	Inner region		
14:15–14:30	CT	Arief Ahmad Uppsala University	Multi-period pulsations in latest CO5BOLD models
14:30–14:45	CT	Behzad Bojnordi Arbab Chalmers University of Technology	Synthetic imaging of DARWIN models at radio and (sub-)millimeter wavelengths
14:45–15:00	CT	Emelie Siderud Uppsala University	Investigating stellar pulsations and their effect on the mass loss of AGB stars
15:00–15:15	CT	Elysabeth Béguin Observatoire de la Côte d'Azur	Retrieving stellar parameters and dynamics of AGB stars with Gaia parallaxes and CO5BOLD RHD simulations
15:15–15:45	Fika		
15:45–16:00	CT	Claudia Paladini ESO Chile	Stellar surfaces with VLT
16:00–17:00	Discussion		

Thursday, 19th of September

Session 2	Resolved structures		
09:15–09:30	CT	Keiichi Ohnaka Universidad Andres Bello	High angular resolution imaging of the dust-forming atmosphere of the AGB star W Hya with ALMA, VLT/SPHERE, and VLTI/MATISSE
09:30–09:45	CT	Markus Wittkowski ESO	Interferometric observations of red giants and supergiants
09:45–10:00	CT	Josef Hron Dept. of Astrophysics, University of Vienna	Carbon Stars: MATISSE data and DARWIN models
10:00–10:45	Fika		
10:45–11:00	CT	Theo Khouri Chalmers University of Technology	Measuring the expansion velocity of the dust in the inner regions of AGB stars
11:00–11:15	CT	Joachim Wiegert Uppsala University	From 3D RHD models of AGB stars and dusty winds to synthetic observables
11:15–12:15	Discussion		
12:15–14:00	Lunch		
14:00–15:00	UU seminar - Nadiia Kostogryz ¹		
Session 3	Microphysics		
15:15–15:30	CT	Marie Van de Sande Leiden Observatory	The surprising chemical richness of the disk around L2 Pup
15:30–15:45	CT	Bernhard Aringer University of Vienna	C ₂ H ₂ and C ₃ in the MIR spectra of carbon stars
15:45–16:00	CT	Mats André Swedish Institute of Space Physics	Ionisation of hydrogen in the chromospheres of the sun and red supergiants: How it works and why we should care.
16:00–17:00	Discussion		
18:30–21:00	Workshop dinner		

¹The abstract and the details of the seminar is available here: <https://indico.uu.se/event/1666/> – The seminar is on the impact of magnetic features on stellar spectra, and how they affect limb darkening and complicate the accurate detection and characterisation of exoplanets and their atmospheres. This would be of general interest to some of us. Otherwise, we could adjust for a longer break.

Friday, 20th of September

Session 4	Circumstellar environment		
09:15–09:30	CT	Elvire De Beck Chalmers University of Technology	Circumstellar complexity around the nearby red supergiant NML Cygni
09:30–09:45	CT	Ka Tat Wong Uppsala University	Submillimetre HCN masers in carbon-rich AGB stars
09:45–10:00	CT	Elizabeth Humphreys ESO	ALMA in the 2040s: Evolved Star Science Case
10:00–10:30	Fika		
10:30–10:45	CT	Hans Olofsson Chalmers University of Technology	Mass-loss-rate characteristics at the tip of the AGB and beyond
10:45–11:00	CT	Shazrene Mohamed University of Virginia, SAAO and UCT	Cool giants and their companions
11:00–11:15	CT	Vlad Răstău University of Vienna	Extended emission in the UV around AGB stars as seen by GALEX
11:15–12:15	Discussion		
12:15–14:00	Lunch		
Session 5	General discussion		
14:00–15:30	Parallel sessions/Open discussions		
15:30–15:50	Fika		
15:50–16:00	Closing remarks		

Suggested topics of discussion

Below is intended to serve as starting points for the discussion sessions.

- **Convection, pulsation, and mass loss**

- Interaction between convection and pulsation: linear vs. non-linear modelling.
- Mechanisms driving pulsations in AGB stars and their impact on mass loss.
- Episodic mass loss in AGB and RSG stars

- **Dust formation and dynamics**

- Nucleation, chemical pathways, and the composition of dust (e.g., SiC and carbon dust).
- Dynamics of dust in stellar outflows: morphology, clumpiness, and structural evolution.
- Uncertainties in dust modelling and their implications for wind formation and outflows.

- **Radiative transfer and coupling with chemistry**

- Challenges in radiative transfer simulations for dust, especially 1D vs. 3D modelling.
- Coupling of radiation and chemical processes: current approaches and areas for improvement.
- Observational constraints: which key observables provide the strongest model constraints?

- **Binary interactions and circumstellar environment**

- Influence of binary systems and stellar companions on mass loss, dust formation, and the circumstellar environment.
- Impact of binary interactions on the evolution of AGB stars and their surroundings.

- **Comparison between models and observations**

- Improving the comparison between models and observational data, particularly with high-resolution observations of nearby AGB stars.
- Standardising test models and addressing uncertainties in model predictions for observables like fluxes and intensity profiles.

List of participants

Name	Affiliation
Arief Ahmad	Uppsala University
Bernd Freytag	Uppsala University
Bernhard Aringer	University of Vienna
Behzad Bojnordi Arbab	Chalmers University of Technology
Claudia Paladini	ESO Chile
Elizabeth Humphreys	ESO
Elvire De Beck	Chalmers University of Technology
Elysabeth Béguin	Observatoire de la Côte d'Azur
Emelie Siderud	Uppsala University
Hans Olofsson	Chalmers University of Technology
Joachim Wiegert	Uppsala University
Josef Hron	University of Vienna
Keiichi Ohnaka	Universidad Andres Bello
Ka Tat Wong	Uppsala University
Kjell Eriksson	Uppsala University
Mark Siebert	Chalmers University of Technology
Mats André	Swedish Institute of Space Physics
Matthias Maercker	Chalmers University of Technology
Miora Andriantsaralaza	Chalmers University of Technology
Marie Van de Sande	Leiden Observatory
Markus Wittkowski	ESO
Ramlal Unnikrishnan	Chalmers University of Technology
Shazrene Mohamed	University of Virginia, SAAO and UCT
Susanne Höfner	Uppsala University
Theo Khouri	Chalmers University of Technology
Thiébaut-Antoine Schirmer	Chalmers University of Technology
Vlad Răstău	University of Vienna

Additional Information

How to get to Uppsala

Uppsala is conveniently located just north of Stockholm Arlanda Airport, from which you can take a direct train to Uppsala Central Station (approximately 17 minutes). If you are traveling from within Sweden or neighboring countries, we recommend taking the train to Uppsala. The journey between Stockholm and Uppsala takes about 35 minutes by train.

How to get to the Ångström Laboratory

The [Ångström Laboratory](#) is situated south of central Uppsala. Buses are the primary mode of public transport within the city. Tickets can be purchased via the [UL app](#) or on board the buses using a credit or debit card (cash is not accepted). From Uppsala Central Station, you may take the bus line number 4 and aim for the **Polacksbacken** stop, which is located just outside the main building of the Ångström Laboratory (House 10). Alternatively, several bus lines (1, 3, 8, 11) stop within walking distance, such as at the **Regementsvägen** stop.

If you prefer walking, the Ångström Laboratory is about 3 km from the central station, and the walk takes approximately 45 minutes, largely along the scenic path by the river Fyrisån.

How to get to our division

The Astronomy and Space Physics division at Uppsala University is located on the 5th floor of House 9 in the Ångström Laboratory. A main elevator on the ground floor of House 9 will take you to our floor (note that access to other floors requires a staff card). Upon reaching the 5th floor, ring the doorbell, and someone from our department will let you in. In our corridor, we have access to a kitchen, smaller meeting rooms, and offices where you can store personal belongings, if needed.

