



# Per Aspera ad astra simul: ERASMUS+ mobility and collaboration opportunities with Czech and Slovak institutes



**Astronomical Institute**  
of the Czech Academy of Sciences

Marek Skarka



Astronomical Institute of the CAS, Fričova 298, 251 65 Ondřejov Czech Republic

IAC seminar, San Cristóbal de La Laguna

November 28, 2017

# Erasmus+



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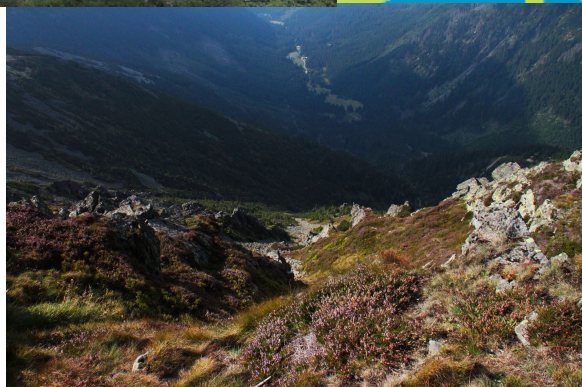
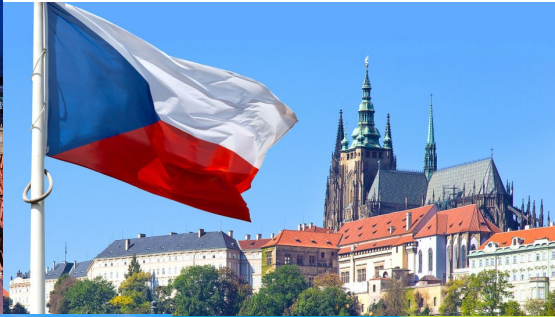
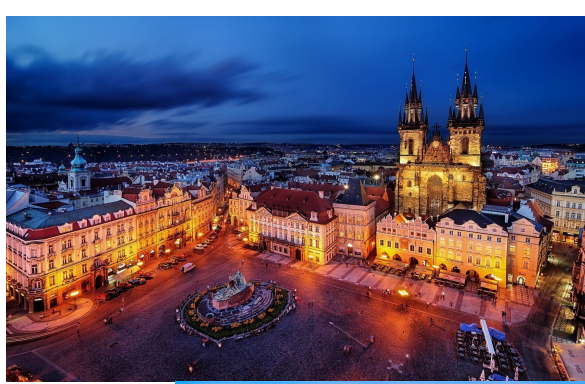
- **Short term mobility**
  - Exchanges between IAC, Czech and Slovak institutes (senior postdocs and higher)
  - Up to 21 days
  - ERASMUS+ covers expenses for living allowance up to 1890 EUR + flight tickets
  - Lecture series, book editing, public lectures
- **Long term exchanges**
  - Early career researchers, Phd students and young postdocs
  - Up to 6 months (up to 1 year at GTC)
  - Release of a call in early 2018

<http://erasmus.asu.cas.cz>

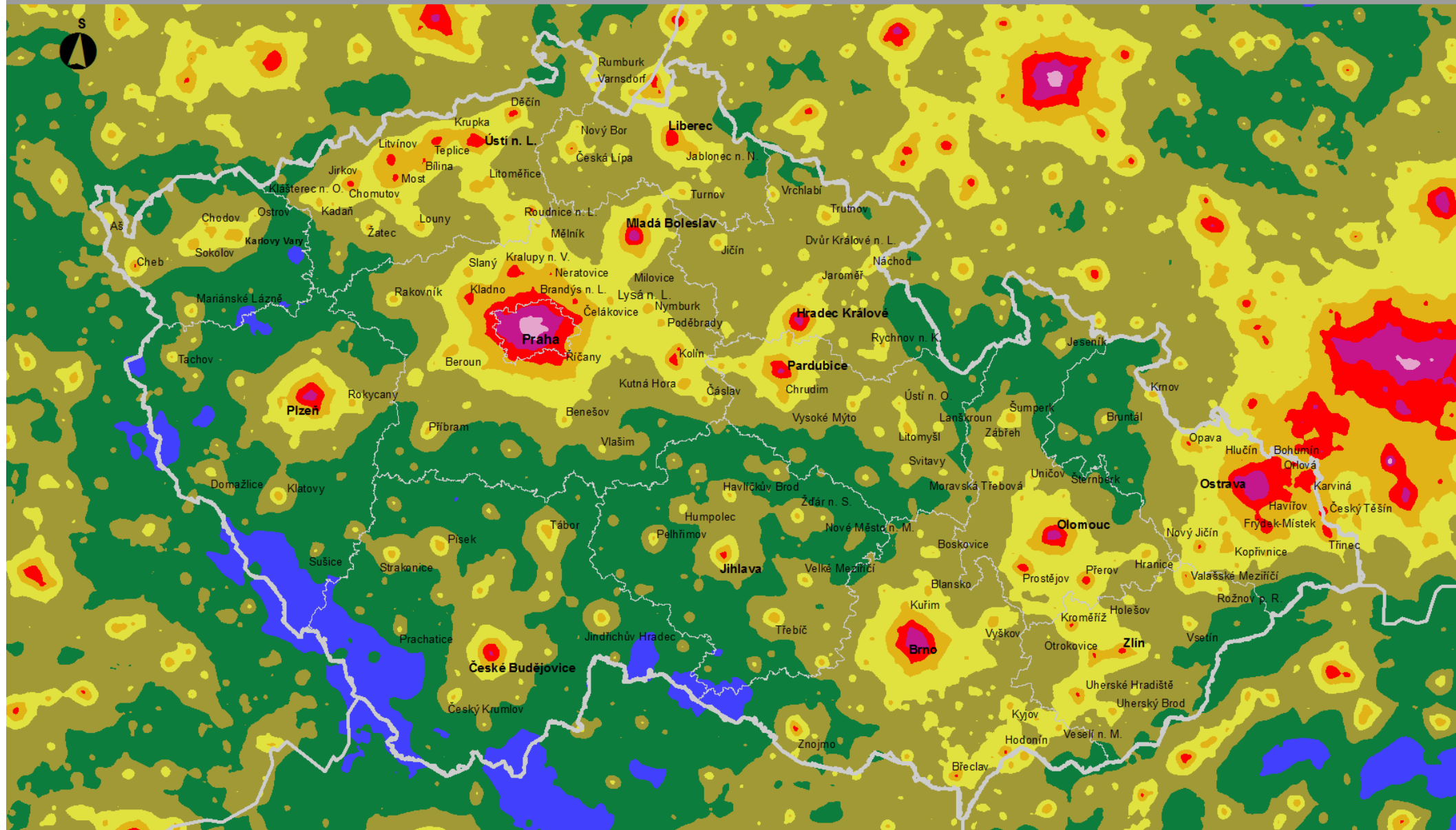


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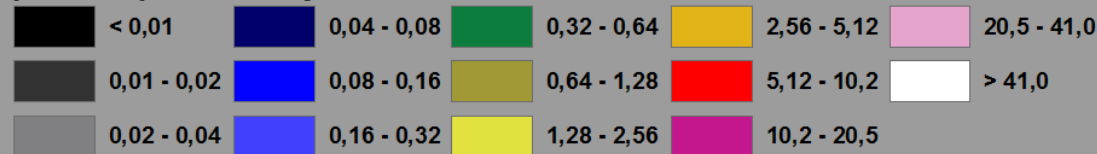




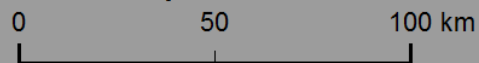
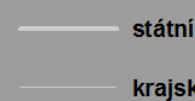
# UMĚLÝ JAS NOČNÍ OBLOHY NAD ČESKOU REPUBLIKOU



poměr k přírodnímu jas



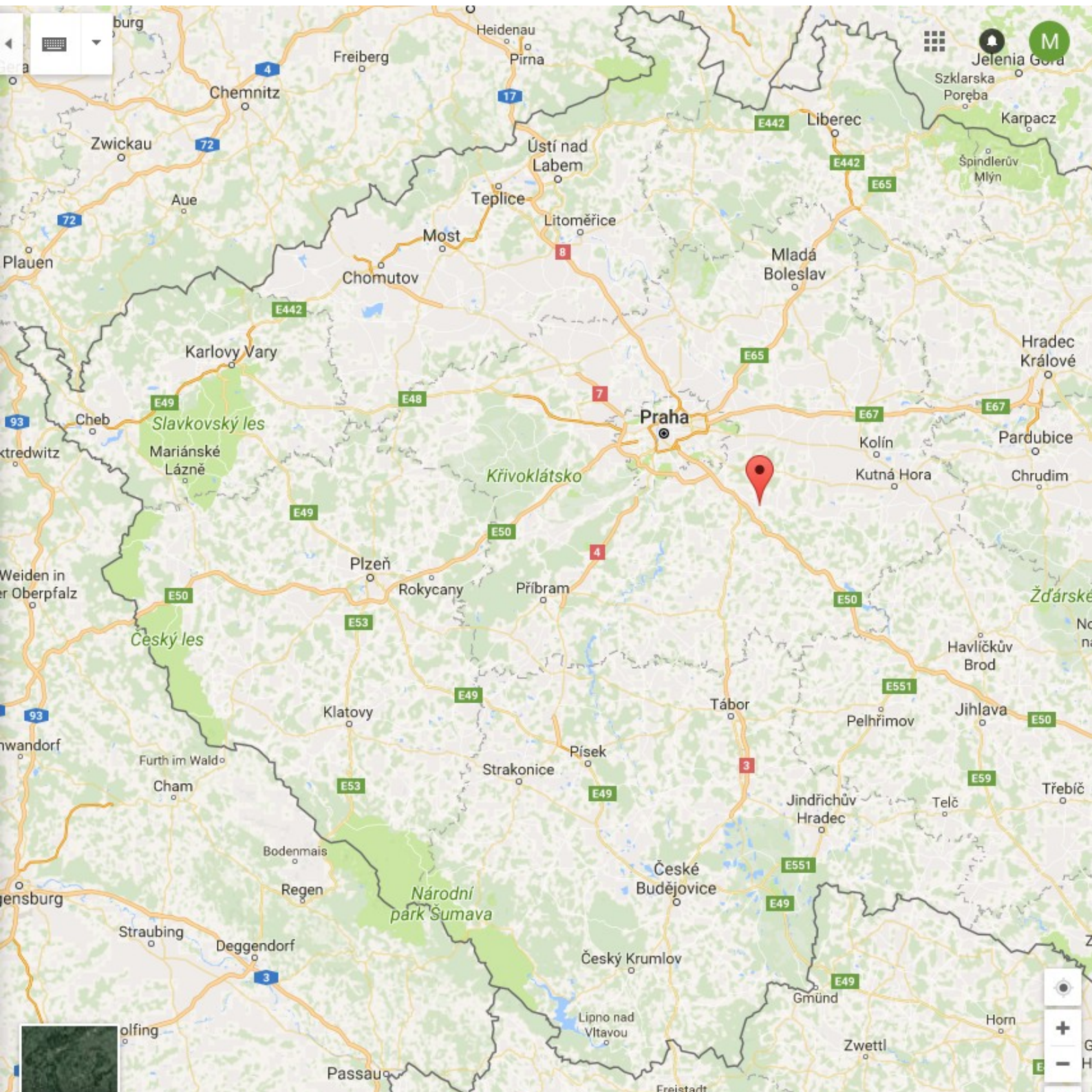
hranice



Česká astronomická společnost, 2017

[www.svetelneznecesteni.cz](http://www.svetelneznecesteni.cz)

Převzato z:  
 Supplement to: The New World Atlas  
 of Artificial Night Sky Brightness,  
 Falchi et al. 2016,  
<http://doi.org/10.5880/GFZ.1.4.2016.001>



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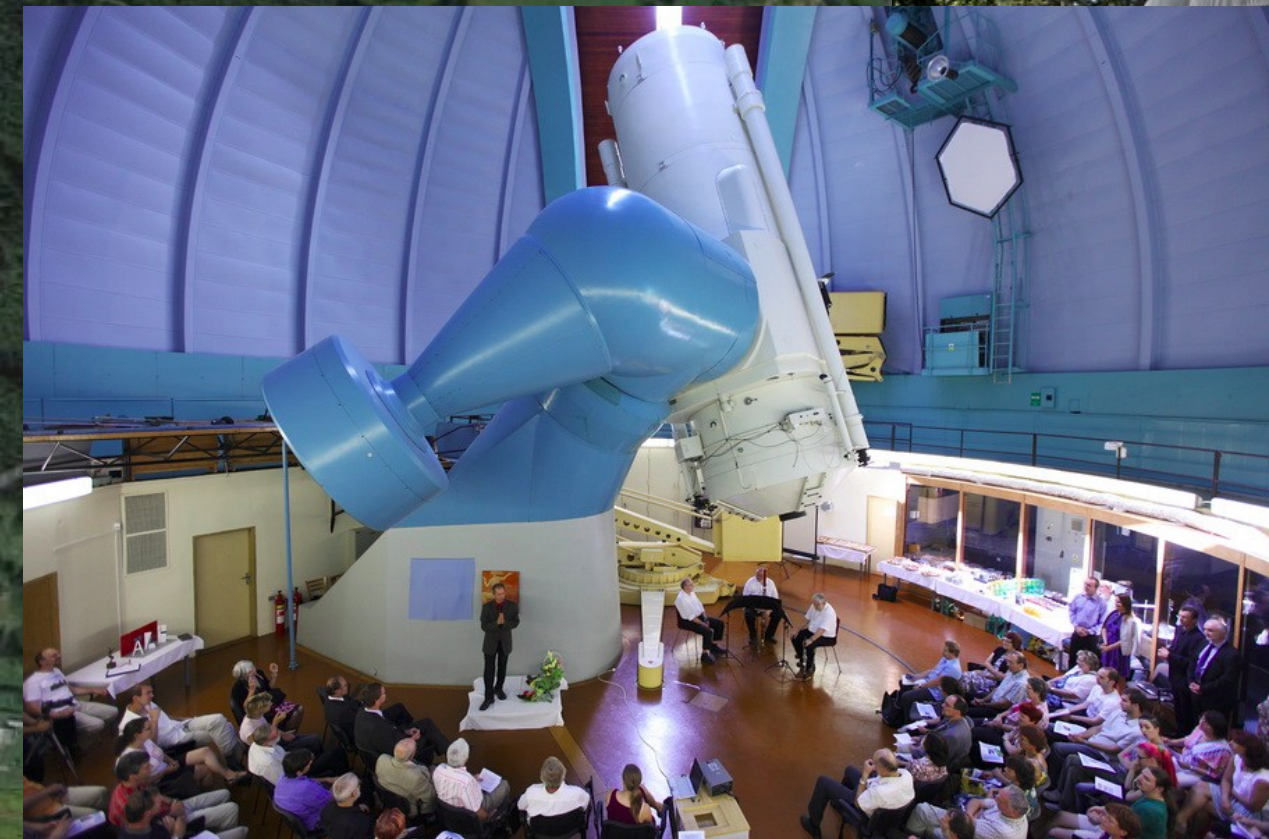


**Astronomical Institute**  
of the Czech Academy of Sciences





Astronomical Institute  
of the Czech Academy of Sciences



## 2-m Perek telescope

- Built in 1967
- Optical spectroscopy
- Modernized, in full operation





odetická Observatoř  
cný č. 244



Nušlova

Nušlova

Fričova

Stri



onomický ústav  
AV ČR - Ondřejov



# Astronomical Institute of CAS



Astronomical Institute  
of the Czech Academy of Sciences

- 1898 – Ground purchased in Ondřejov
- 1928 – Observatory donated to Czech state
- 1954 – Observatory became a part of the  
Czech Academy of Sciences

**Scientific cooperation:** ~160 employees  
IAU, ESO (2007), ESA (2008)

## Departments:

- **Solar physics** (spots, oscillations, eruptions, ALMA, Solar orbiter, GREGOR, EST)
- **Stellar physics** (hot stars, stellar atmospheres and winds, white dwarfs, exoplanets, ESO, GAIA, TESS)
- **Interplanetary matter** (European and desert firebal network, asteroids)
- **Galaxies and planetary systems** (dynamics and kinematics of galaxies, interstellar matter, formation and fade of stars)



**Science, public outreach,  
teaching activities**

[www.asu.cas.cz](http://www.asu.cas.cz)

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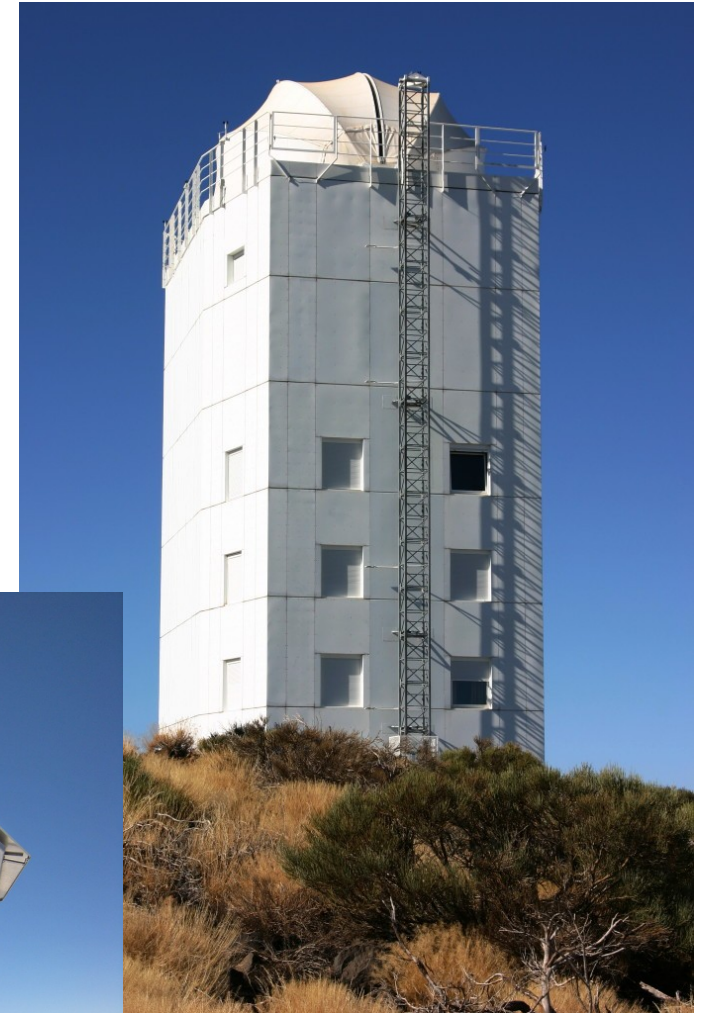
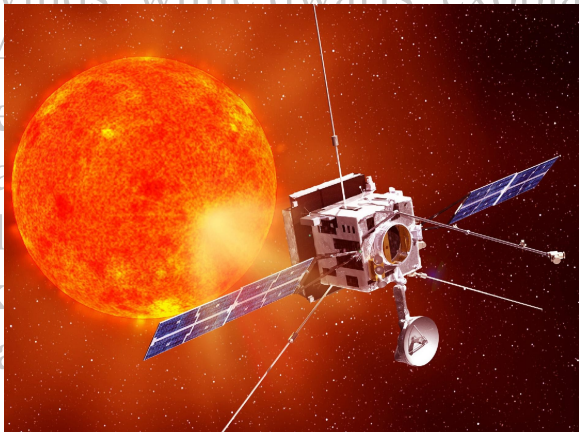
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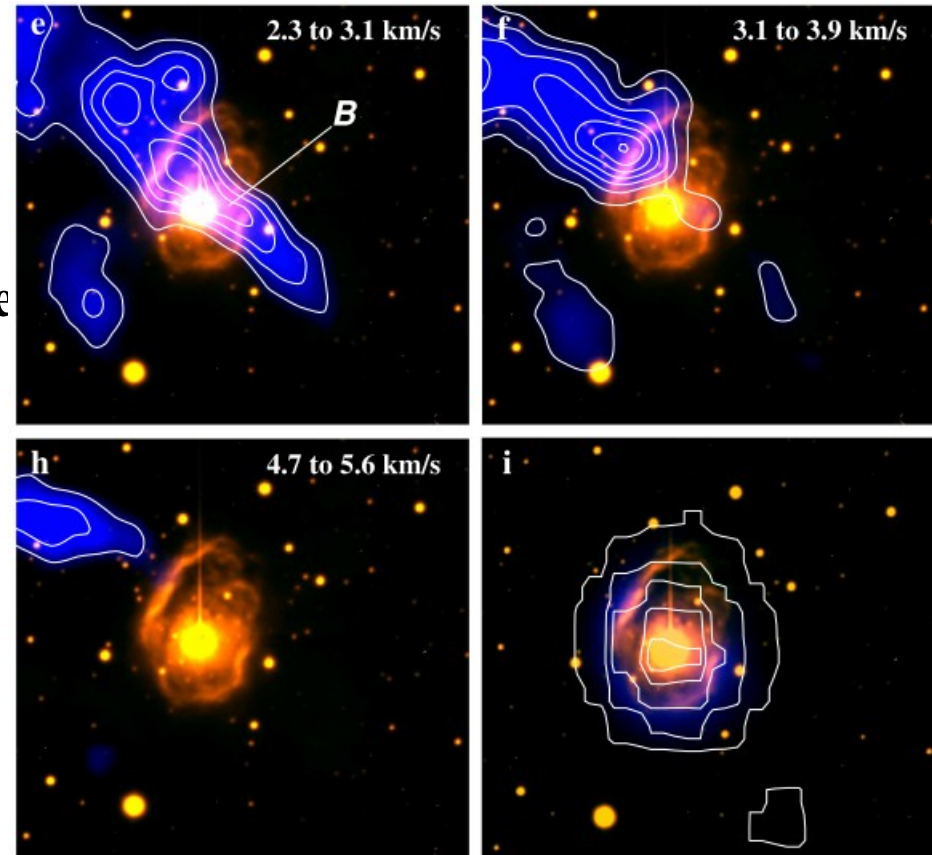
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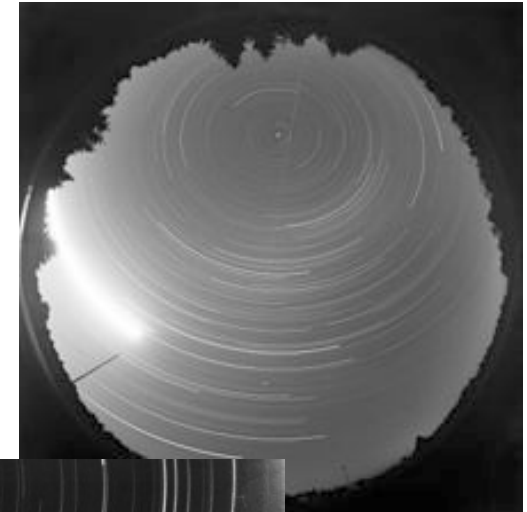
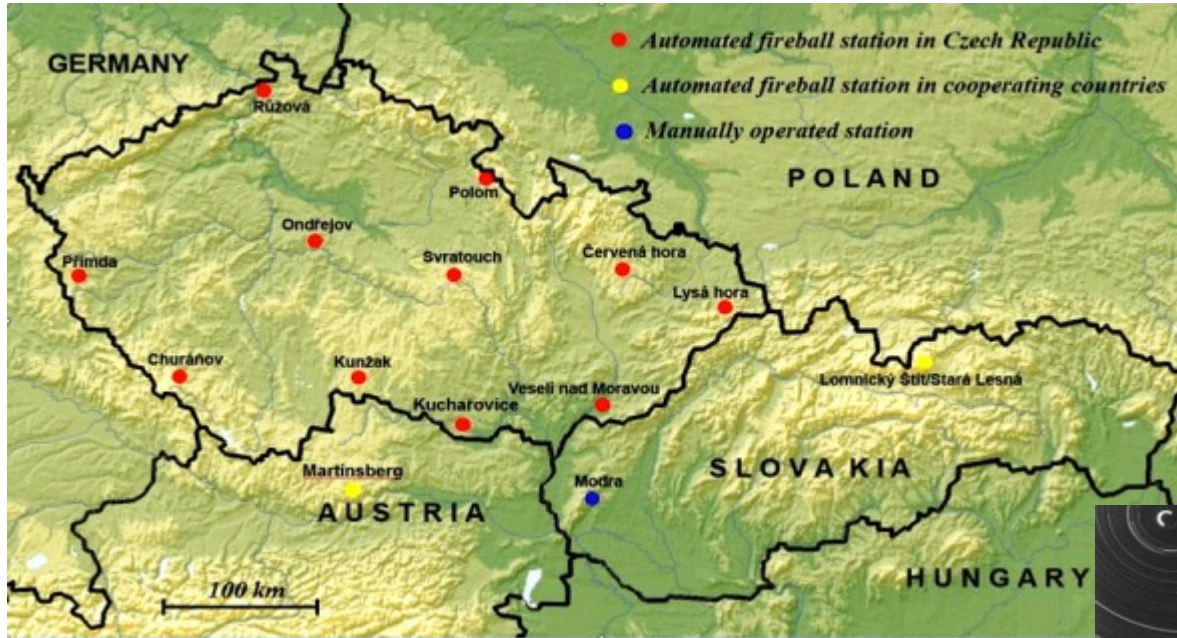
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# Astronomical Institute of CAS



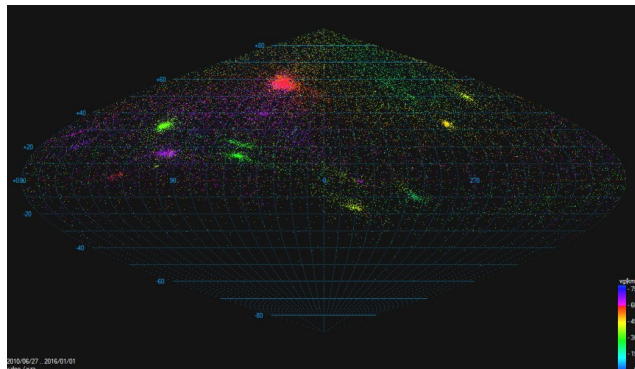
Astronomical Institute  
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ALMA, Solar Orbiter, GREGOR, EST)

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# Astronomical Institute of CAS



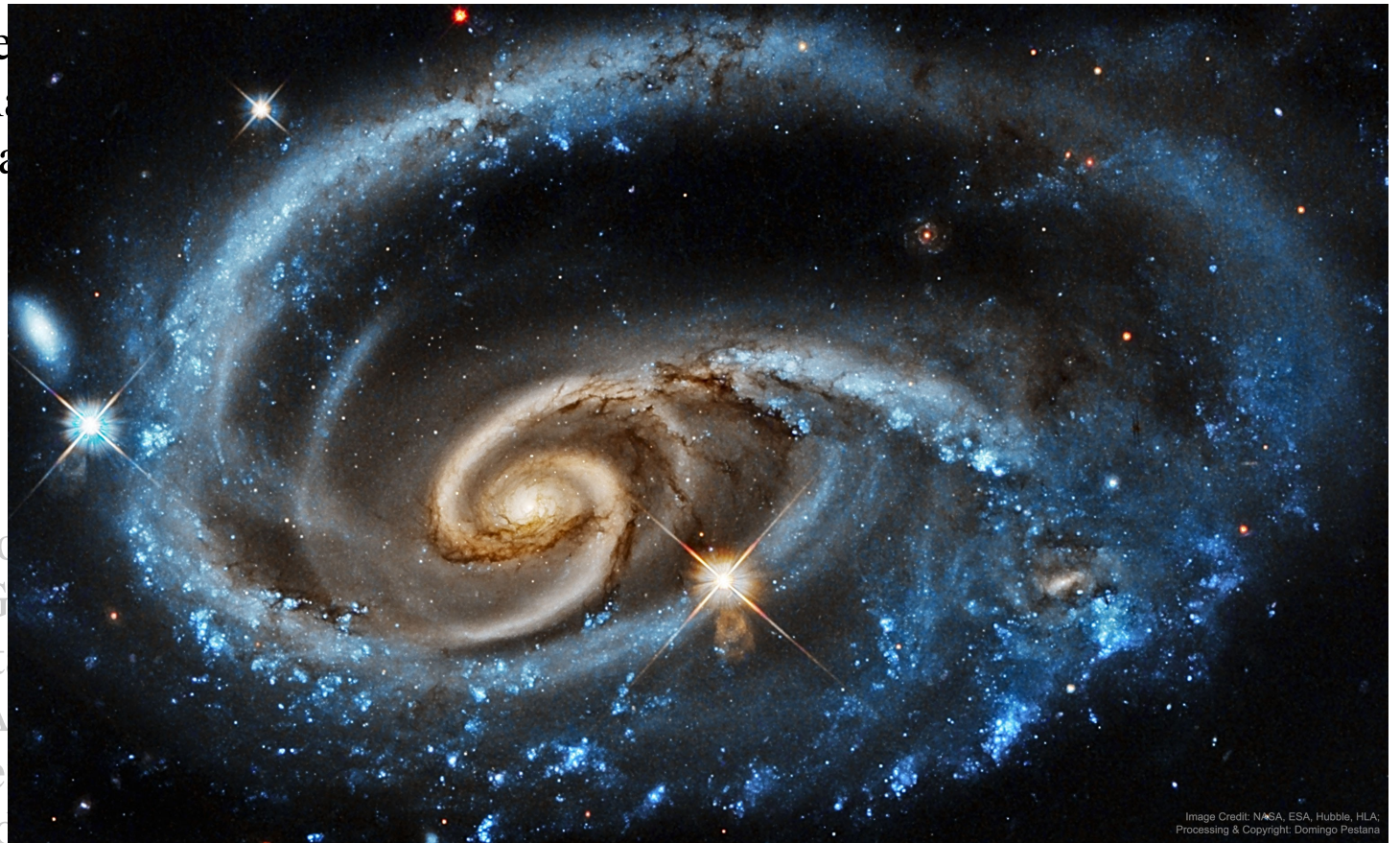
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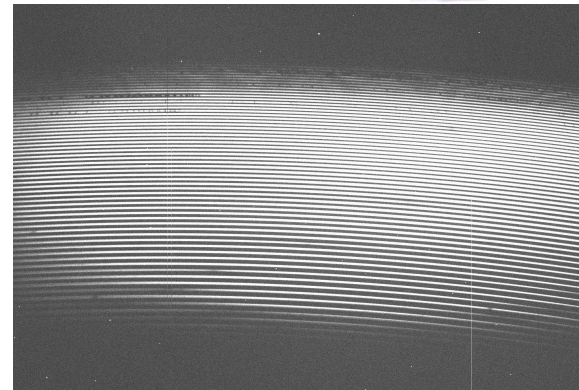
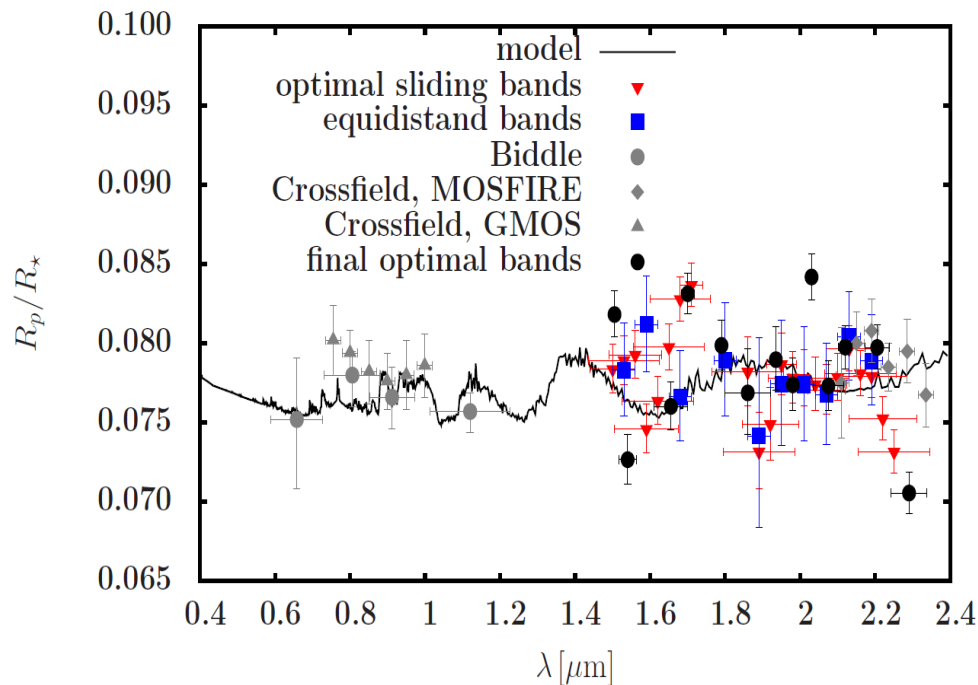
# Projects - *Exoplanet group*



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**P. Kabáth** (head, [petr.kabath@asu.cas.cz](mailto:petr.kabath@asu.cas.cz)), **T. Kloková** (postdoc), **M. Skarka** (postdoc), **E. Plávalová** (postdoc), **M. Blažek** (PhD student), **D. Dupkala**, **J. Dvořáková** (BSc students)

- RV spectroscopic follow-up of K2/TESS/PLATO candidates
- PLATO space mission ground based support
- Exoplanetary atmospheres – photometry, transmission spectroscopy
- Stellar activity and exoplanets



+ close cooperation with  
Tautenburg observatory



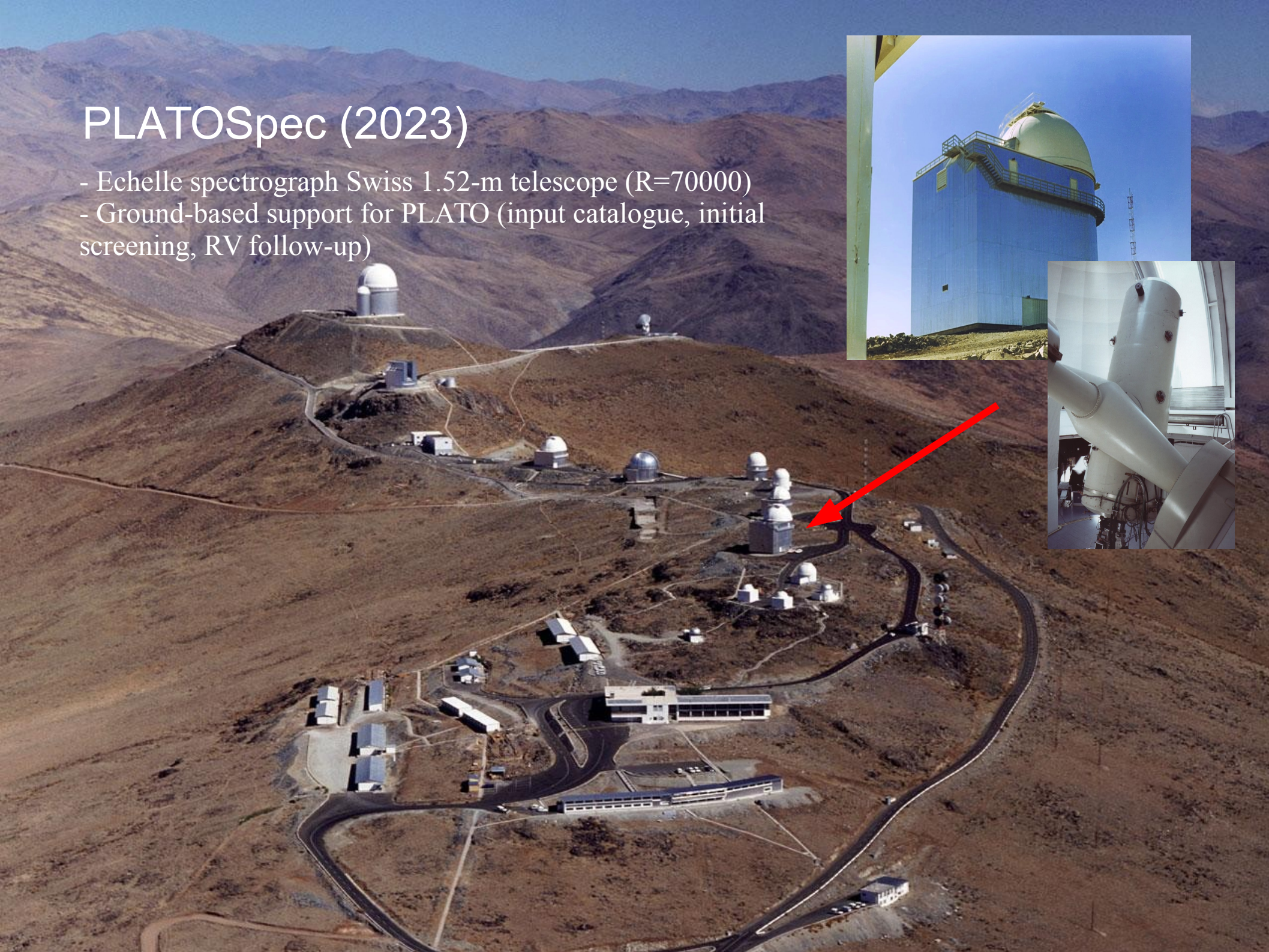
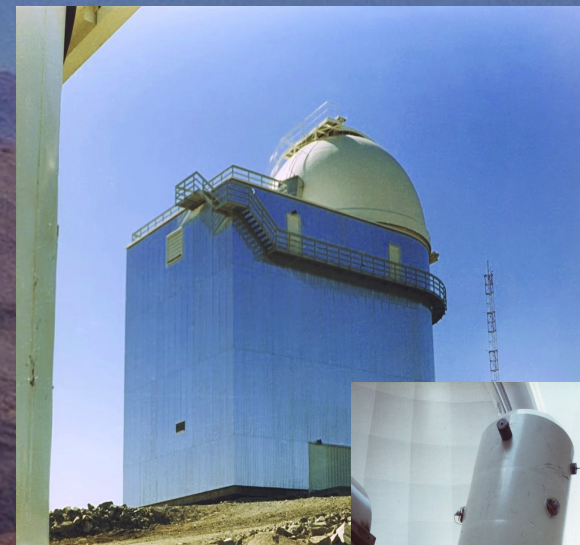
European  
Southern  
Observatory

[www.eso.org](http://www.eso.org)



# PLATOSpec (2023)

- Echelle spectrograph Swiss 1.52-m telescope (R=70000)
- Ground-based support for PLATO (input catalogue, initial screening, RV follow-up)



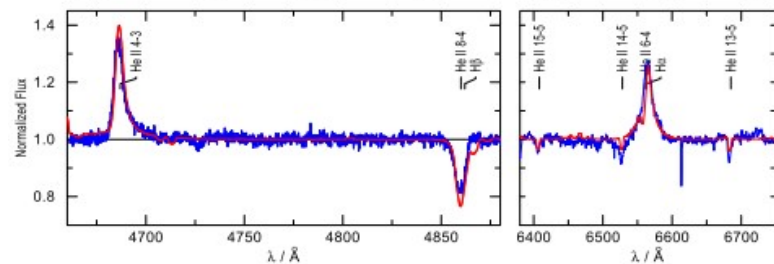
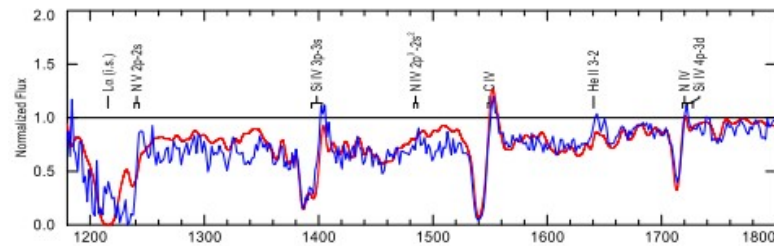
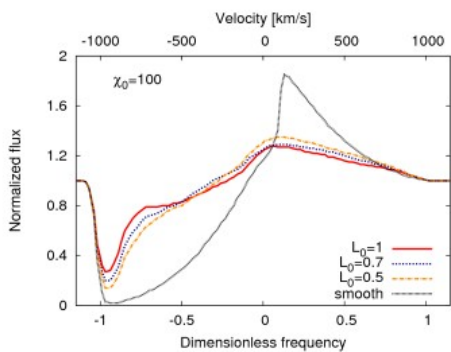
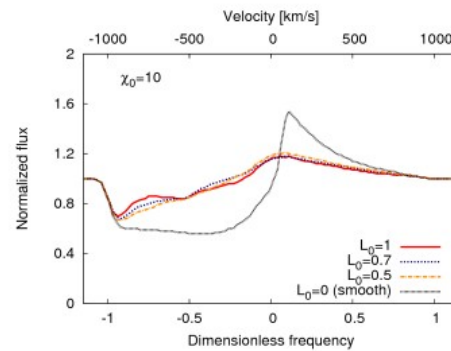
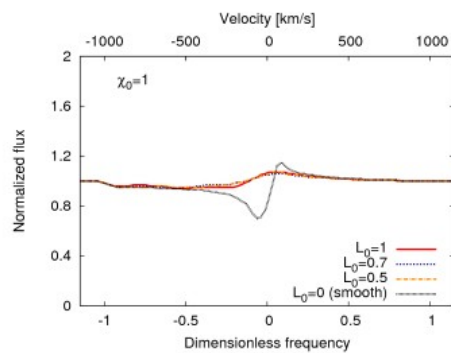


## *Theoretical modeling of massive stars and their winds*

- Stellar winds modeling
- Development of new codes including multi-dimensional and non-equilibrium effects

## *Quantitative spectroscopy of massive stars*

- proper determination of stellar and wind parameters
- determination of mass-loss rates of massive stars



**Dr. Brankica Kubátová**  
[brankica.kubatova@asu.cas.cz](mailto:brankica.kubatova@asu.cas.cz)

# Projects -

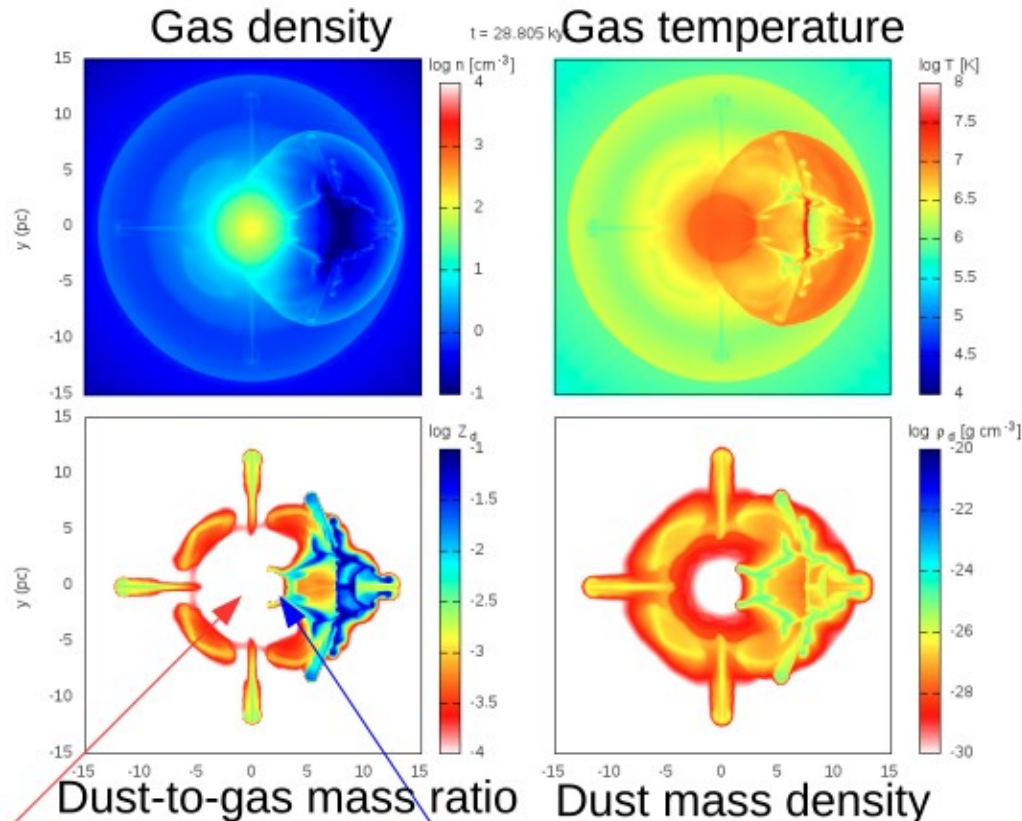
## *Dusty Avalanches Enriching the Circum-star cluster medium*



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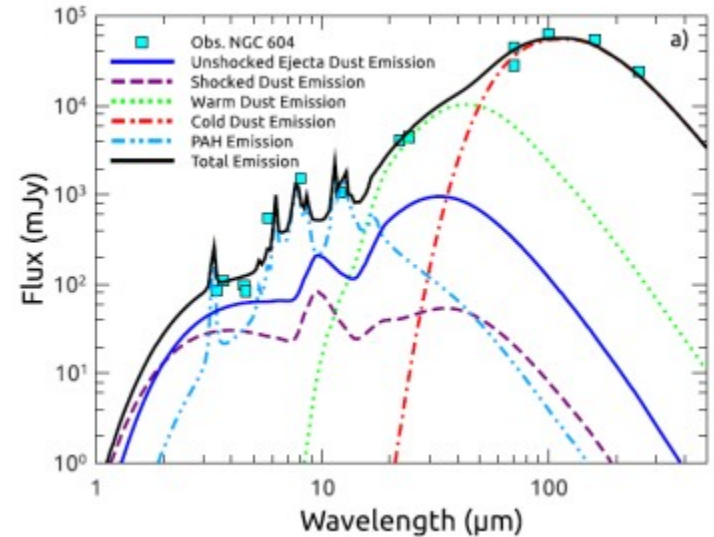
Sergio Martínez González (leader), R. Wünsch, J. Palouš

- 3D HYDRO SIMULATIONS WITH FLASH OF THE INTERACTION OF SNe AND STAR CLUSTER WINDS



Dust injected by SNe close the center of the star cluster: Manifested transiently at NIR-MIR wavelengths and rapidly destroyed.

Dust injected by SNe close to the edge the star cluster: Survives the SN reverse shock and shines persistently at MIR-FIR wavelengths.



Sergio Martínez González (Posdoc)  
martinez@asu.cas.cz

# Projects –

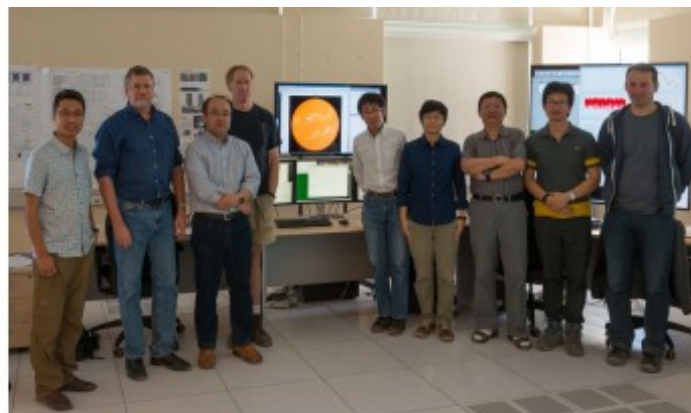
# *Astrophysical research with ALMA*



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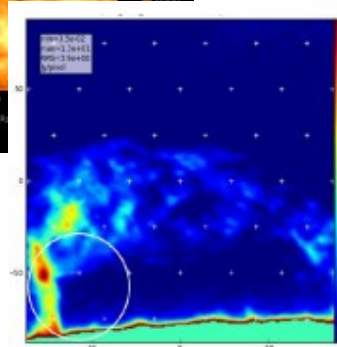
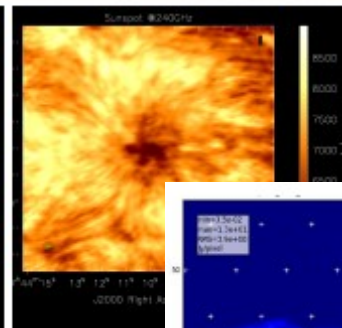
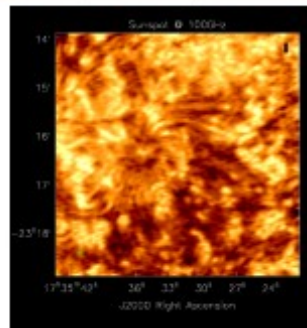
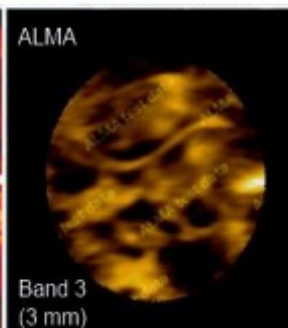
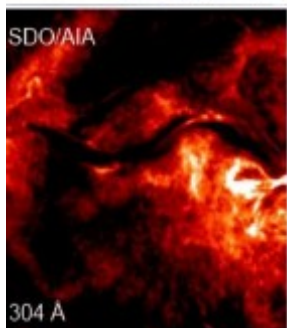


EUROPEAN ARC  
ALMA Regional Centre || Czech



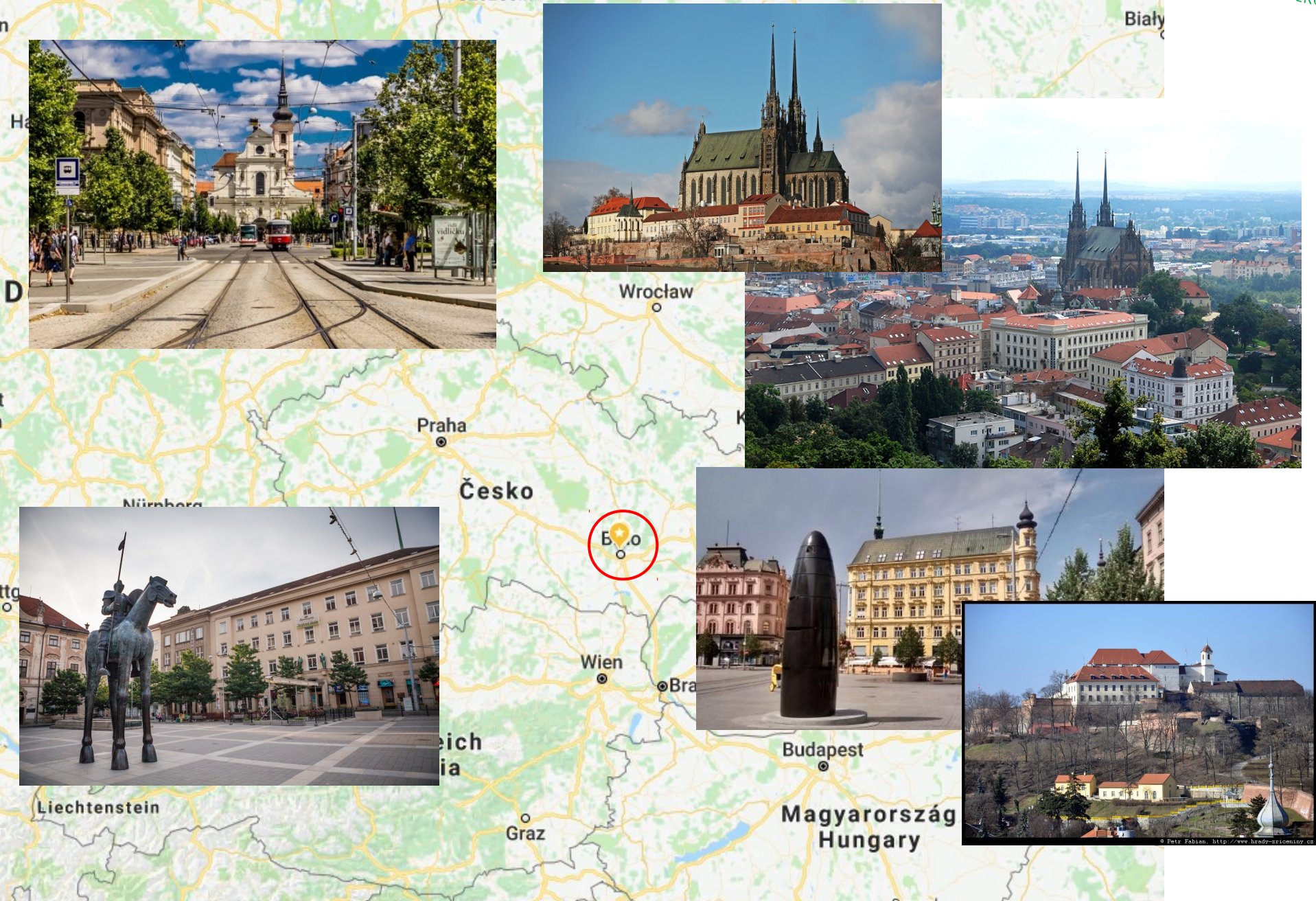
## European ALMA Regional Center – Czech node

- Provides support to the members
- Spread the technical knowledge
- Helps ALMA developers
- Helps with proposal preparation
- Helps with science data preparation



**Dr. Miroslav Bárta**  
[barta@asu.cas.cz](mailto:barta@asu.cas.cz)

# Department of Theoretical Physics and Astrophysics, Masaryk University



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## Masaryk University

- Founded in 1919
- 9 faculties
- 36 000 students

## DTPA (Astro)

- Part of the Faculty of sciences
- 11+6 researchers
- Students: BSc 48, MSc 11, PhD 20



60cm Newtonian (Brno)  
DK154 (La Silla)



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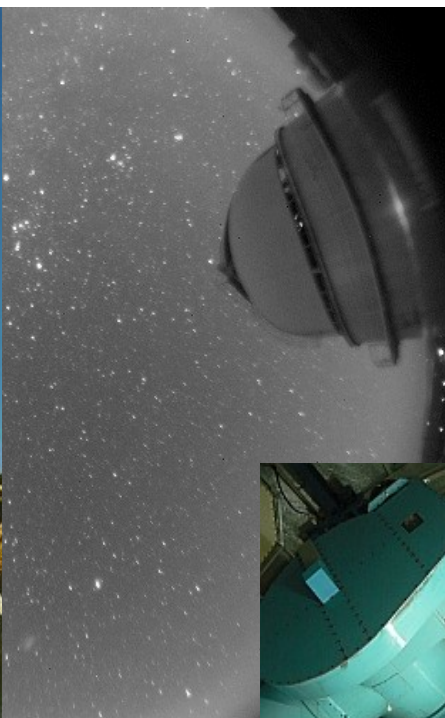


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## Research

- Stellar atmospheres and stellar winds
- Hot stars
- Variable stars in general (binaries, pulsating stars, CP ... )
- Stellar systems
- Methods and tools for data analysis
- High-energy astrophysics
- History of astronomy

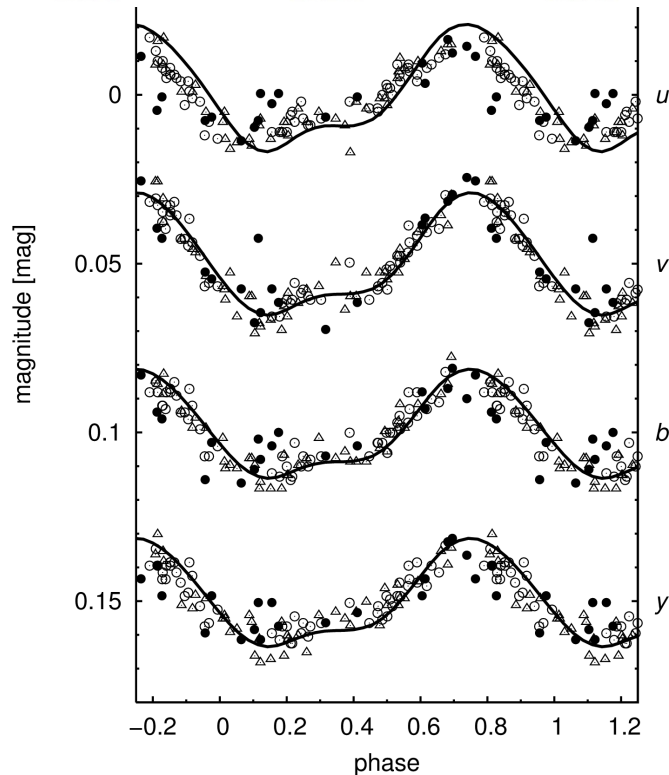
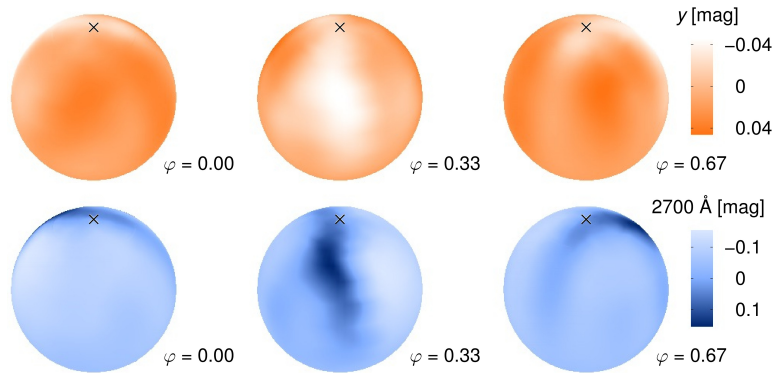


<http://astro.physics.muni.cz>

# Projects

## *Light variability of CP stars*

Test and model the light variability based on the abundance maps



Prof. Jiří Krτίčka  
krticka@sci.muni.cz

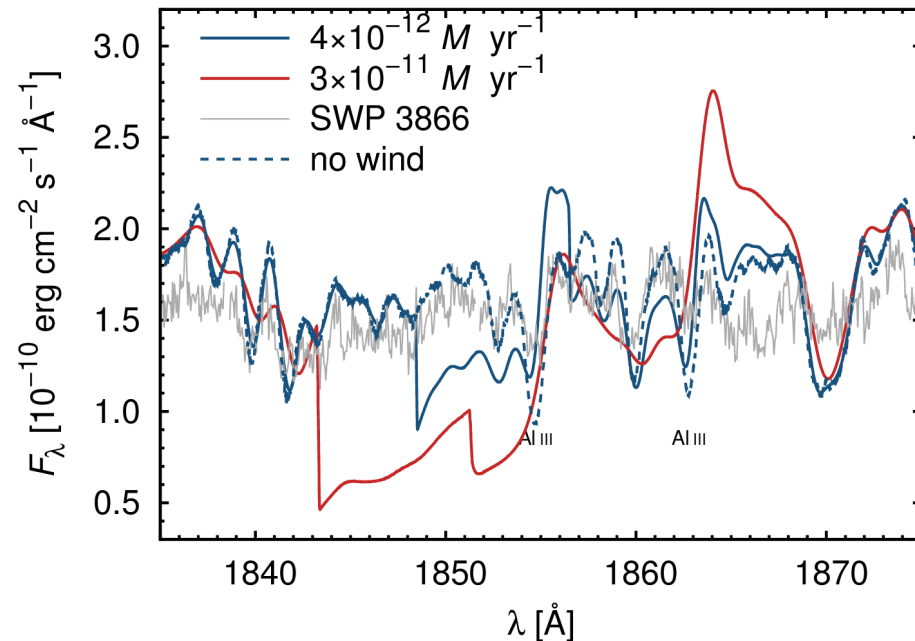


## *Line force in accreting first stars*

- Calculation of the line radiative force on accreting first stars to test if the line force is able to suspend the accreting flow
- Determination of the upper mass limit of first stars

## *Stellar winds in main-sequence B-stars*

Search for winds in B-stars employing METUJE code





# Czech people involved in ERASMUS+



Astronomical Institute  
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**Dr. Petr Kabáth**  
Main coordinator  
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**Dr. Tereza Klocová**  
Exoplanets  
[klocova@asu.cas.cz](mailto:klocova@asu.cas.cz)



**Prof. Vladimír Karas**  
Director of AI ASCR  
Relativistic astrophysics  
[vladimir.karas@cuni.cz](mailto:vladimir.karas@cuni.cz)



**Dr. Marek Skarka**  
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[skarka@asu.cas.cz](mailto:skarka@asu.cas.cz)



**Dr. Jan Janík**  
Coordinator MU  
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[honza@sci.muni.cz](mailto:honza@sci.muni.cz)



**Assoc. Prof. Ernst Paunzen**  
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[epaunzen@physics.muni.cz](mailto:epaunzen@physics.muni.cz)



**Prof. Jiří Krtička**  
Head of the astrophysical dept.  
Stellar atmospheres, winds  
[krticka@sci.muni.cz](mailto:krticka@sci.muni.cz)



<http://erasmus.asu.cas.cz>



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<http://astro.physics.muni.cz>

# Thank you for your attention



Dr. David Jones  
Coordinator IAC



Dr. Jorge Garcia Rojas



Dr. Peter Pessev  
Coordinator GTC