

Astronómia na MatFyze

RNDr. Roman Nagy, PhD.
Comenius University in Bratislava

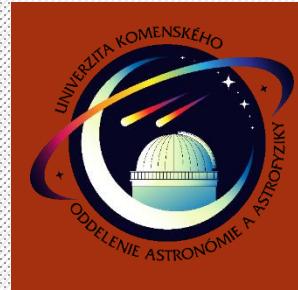
Bezovec 2020

Outline

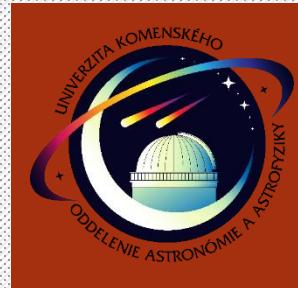
- astronomy at the university
- the fields of research
- galactic astrophysics



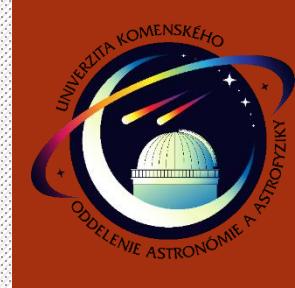
Faculty of Mathematics, Physics and Informatics



Faculty of Mathematics, Physics and Informatics



Astronomy at Comenius University

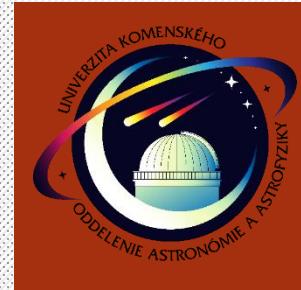


- Faculty of Mathematics, Physics and Informatics
- Department of Astronomy, Physics of the Earth, and Meteorology
- Division of Astronomy and Astrophysics

AGO Modra



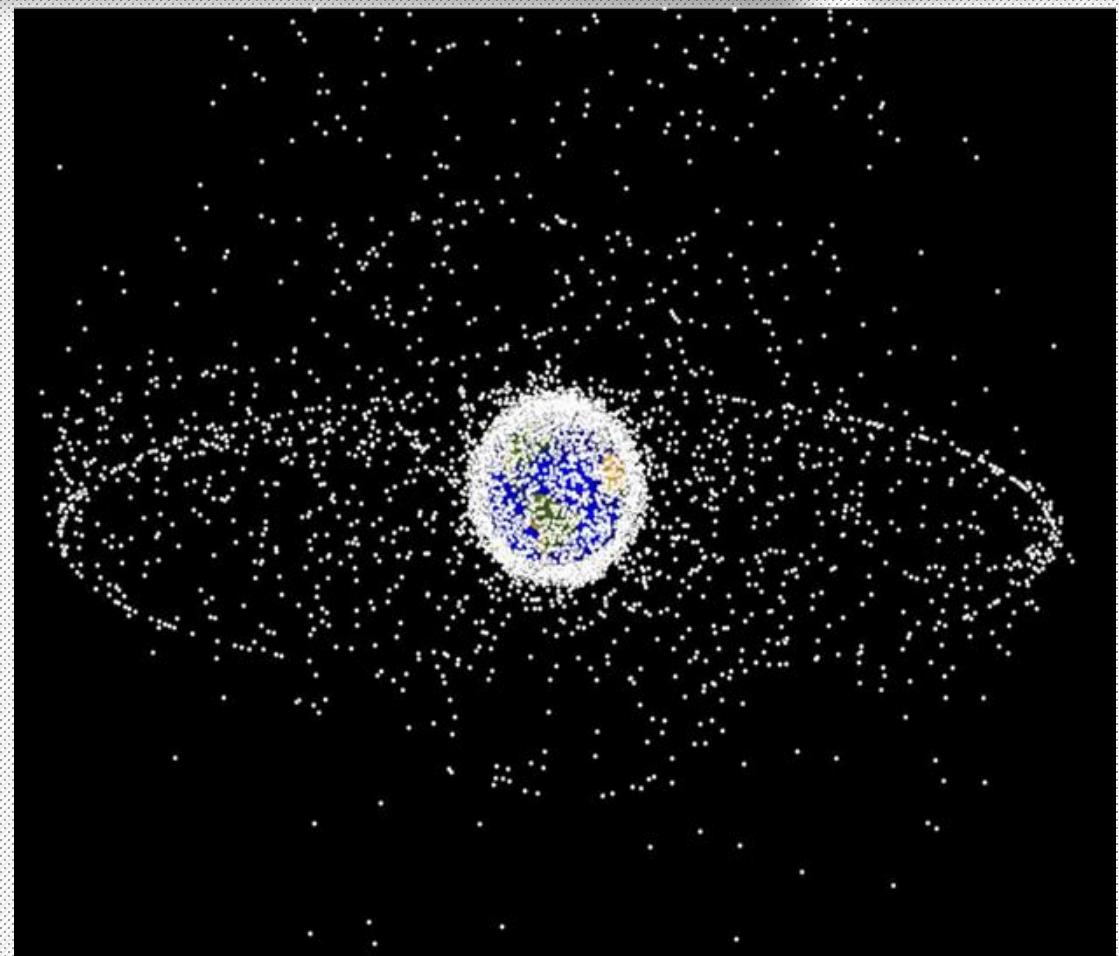
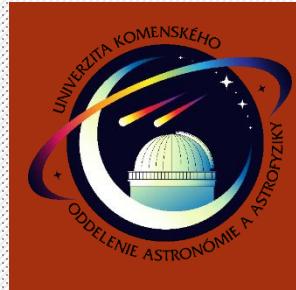
60 cm telescope



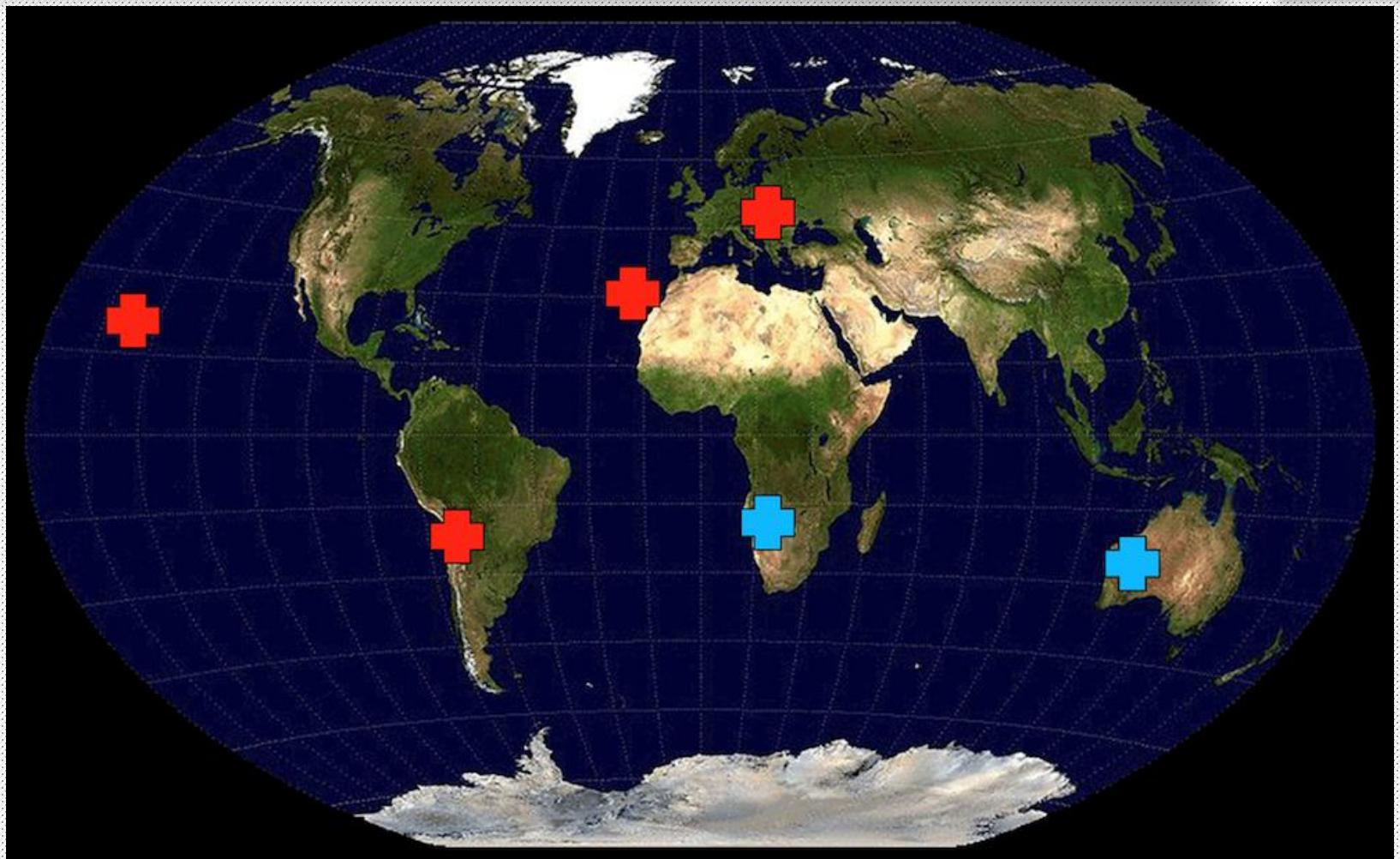
AGO Modra



70 cm telescope - space debris



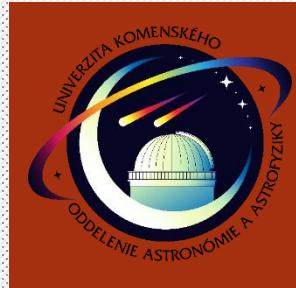
AMOS



AMOS - Teide Observatory



Students and colleagues



Astronomy at Comenius University



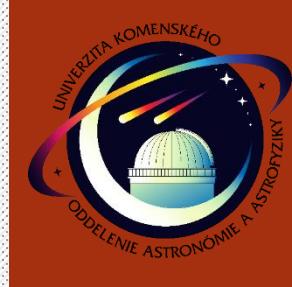
- fields of research:
 - interplanetary matter (Karol Havrla)
 - meteor astronomy
 - galactic astrophysics
 - space debris (Matej Zigo)
 - high energy astrophysics (Patrik Čechvala)

Interplanetary matter



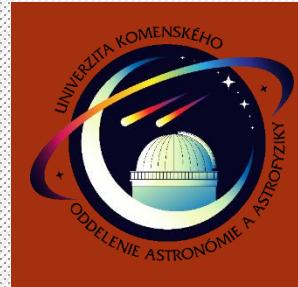
- astrometry and photometry of asteroids and comets (AGO60)
- dynamics and physical properties of asteroids (rotation rates, ...)
- theoretical research

Meteor astronomy



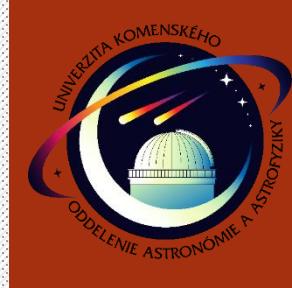
- observations:
 - video
 - radar
 - spectroscopic

One thousand Geminids above Tenerife Dec.13/14, 2017



AMOS, Teide, IAC
Tóth et al., 2017

AMOS Spectral Instrumentation



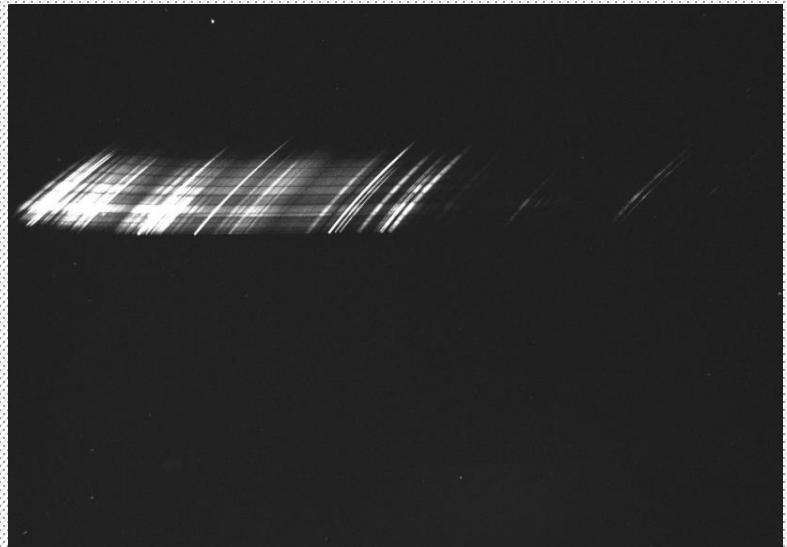
AMOS-Spec

- Camera: 1600x1200, 12 fps
- Grating: 1000 grooves/mm
- Resolution: 1.5 nm/px
- FOV: 100 deg circular
- Lim. mag.: -2.0



AMOS-HS

- Camera: 2048x1536, 15 fps
- Grating: 1000 grooves/mm
- Resolution: 0.5 nm/px
- FOV: 60 x 45 deg
- Lim. mag.: -1.5



Dynamical modelling



- 101955 Bennu and 162173 Ryugu
- Dynamical modelling of ejected particles to the Earth
- 5000 test particles
- Integration time - 1000 yrs

The image shows a journal cover for "Planetary and Space Science". At the top left is the Elsevier logo, which includes a tree and the word "ELSEVIER". In the center, the journal title "Planetary and Space Science" is written in a serif font. Below the title, the journal homepage is listed as www.elsevier.com/locate/pss. To the right of the title is a small thumbnail image of the journal's front cover, which has a yellow header with the journal name and a blue body featuring a starry background. At the bottom left, there is an abstract text: "101955 Bennu and 162173 Ryugu: Dynamical modelling of ejected particles to the Earth". Below this, the authors' names are listed: "M. Kováčová*, R. Nagy, L. Kornoš, J. Tóth". At the bottom right, there is a "Check for updates" button with a circular arrow icon.

Contents lists available at [ScienceDirect](#)

Planetary and Space Science

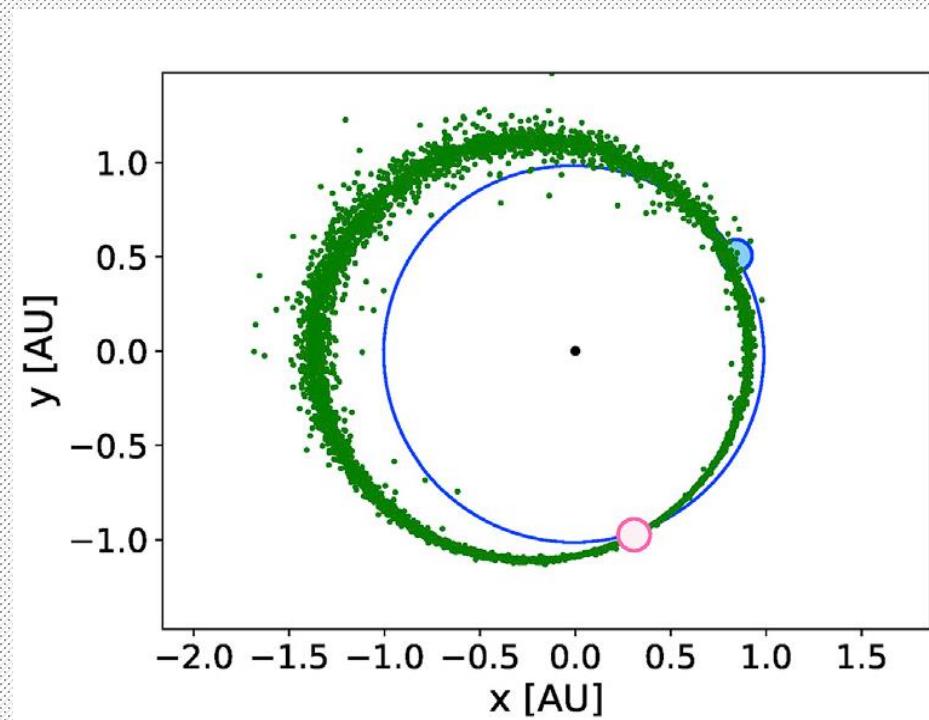
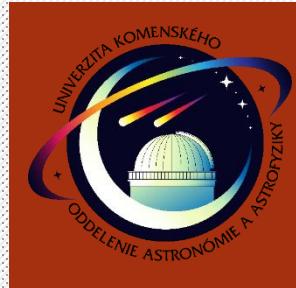
journal homepage: www.elsevier.com/locate/pss

101955 Bennu and 162173 Ryugu: Dynamical modelling of ejected particles to the Earth

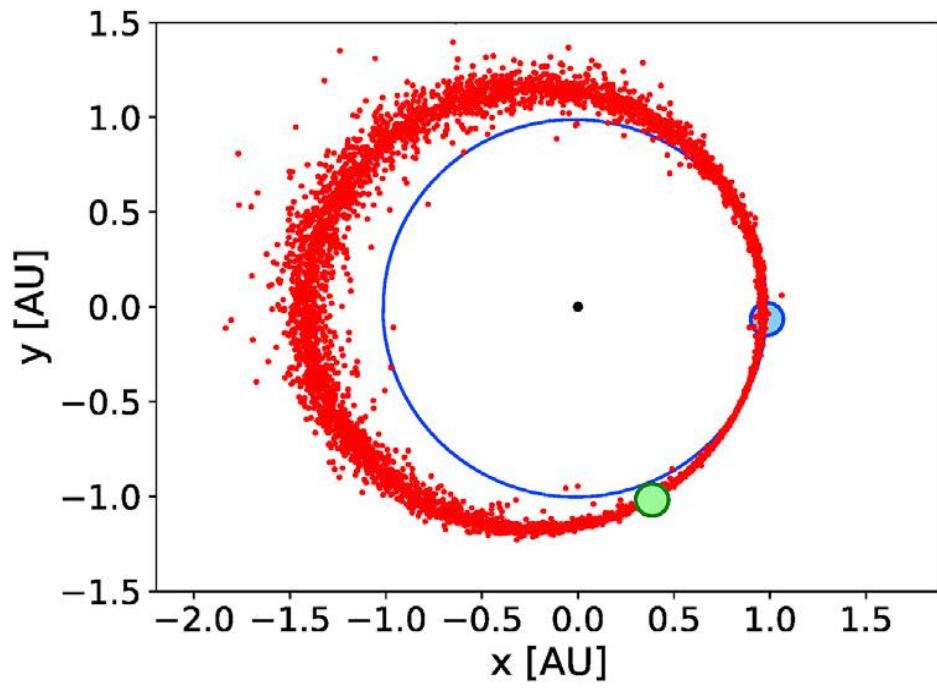
M. Kováčová*, R. Nagy, L. Kornoš, J. Tóth

* of Mathematics, Physics, and Informatics, Comenius University, Mlynská dolina, 842 48, Bratislava, Slovakia

After 1000 yrs

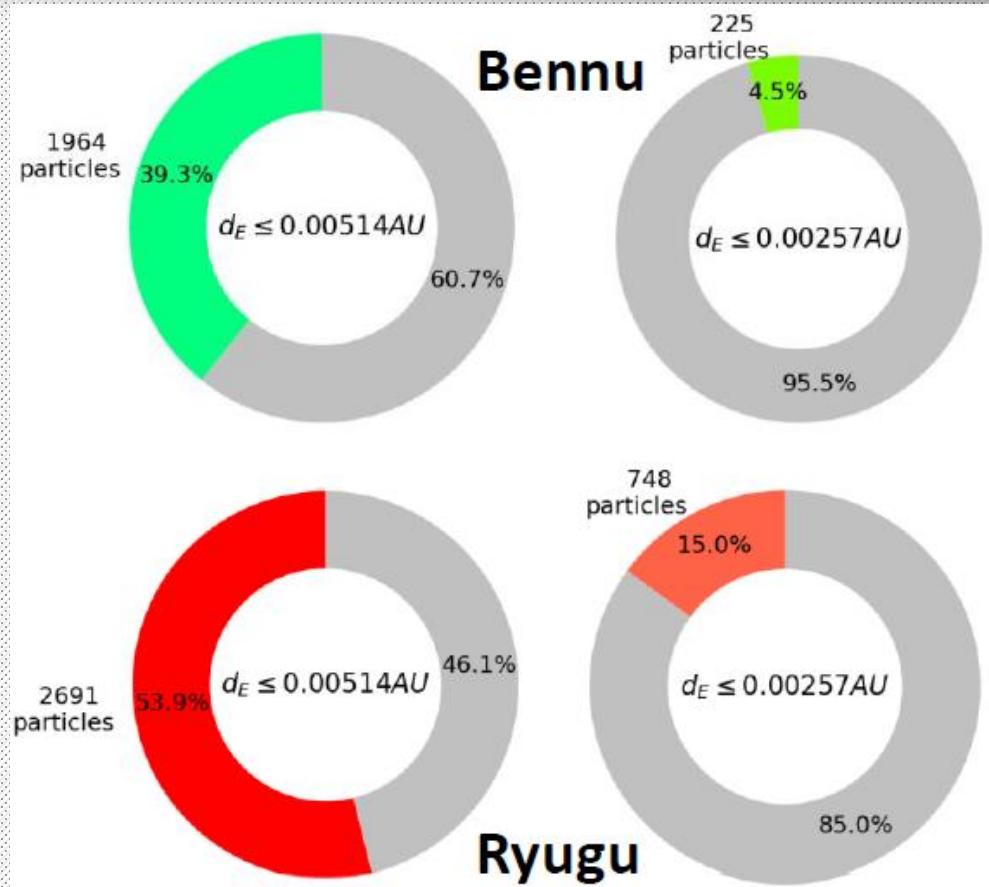


Bennu



Ryugu

Dynamical modelling



Galactic astrophysics



- Kinematics and dynamics of the Galaxy
- Galactic structure using GAIA data
- SIM - comparison of MOND and NEWTON theories of gravity

Structure of the outer Galactic disc with Gaia DR2



- Investigating the remote regions of the Galactic disc
- Using GAIA DR2 data
- Focusing on the Galactic warp

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<https://doi.org/10.1051/0004-6361/201937289>
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**Astronomy
&
Astrophysics**

Structure of the outer Galactic disc with *Gaia* DR2

Ž. Chrobáková^{1,2}, R. Nagy³, and M. López-Corredoira^{1,2}

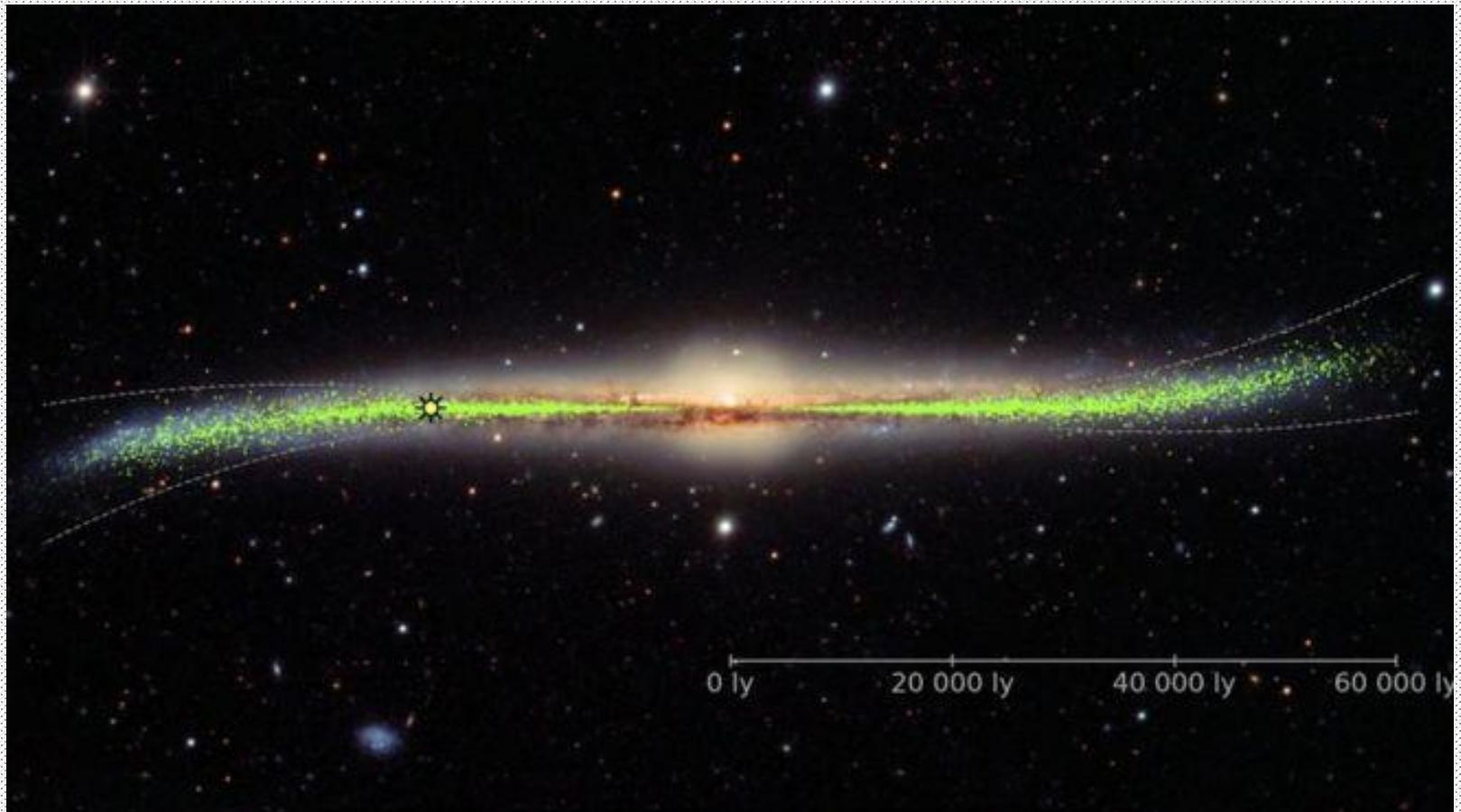
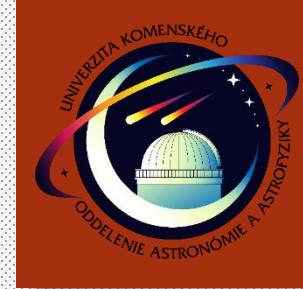
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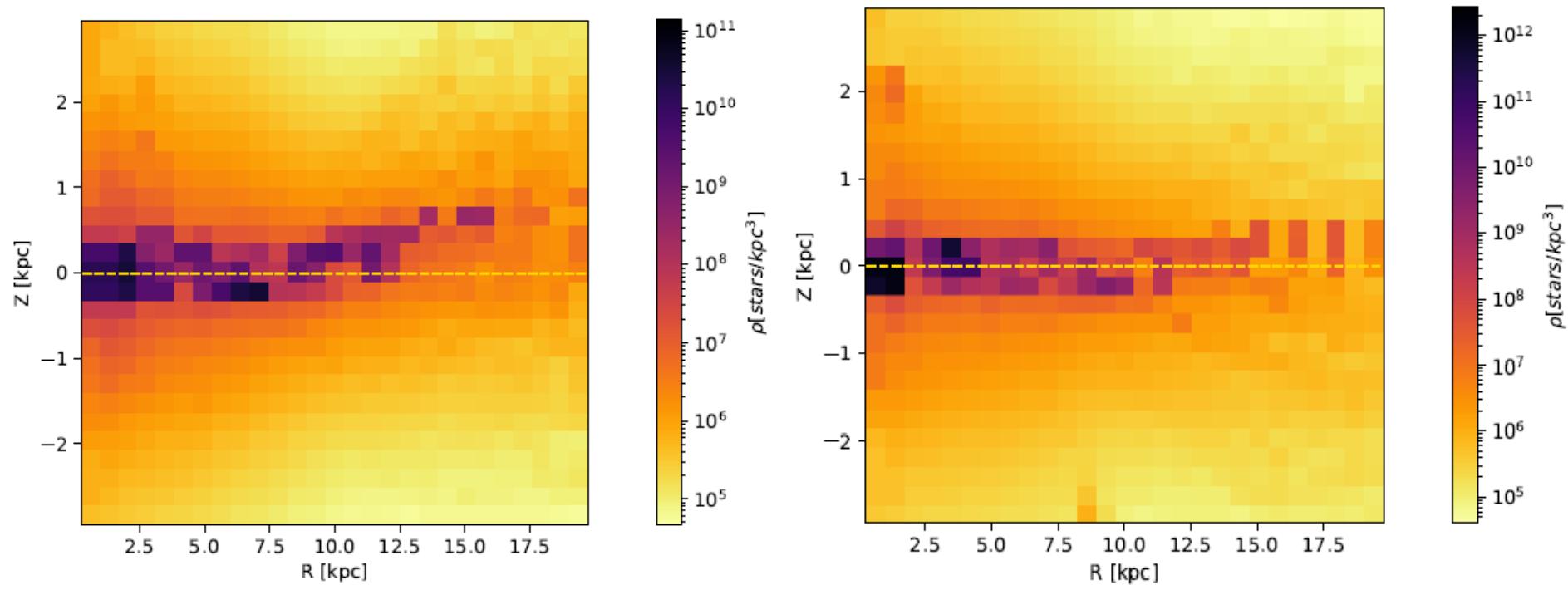
³ Faculty of Mathematics, Physics, and Informatics, Comenius University, Mlynská dolina, 842 48 Bratislava, Slovakia

Received 9 December 2019 / Accepted 31 March 2020

Structure of the outer Galactic disc with Gaia DR2 - warp



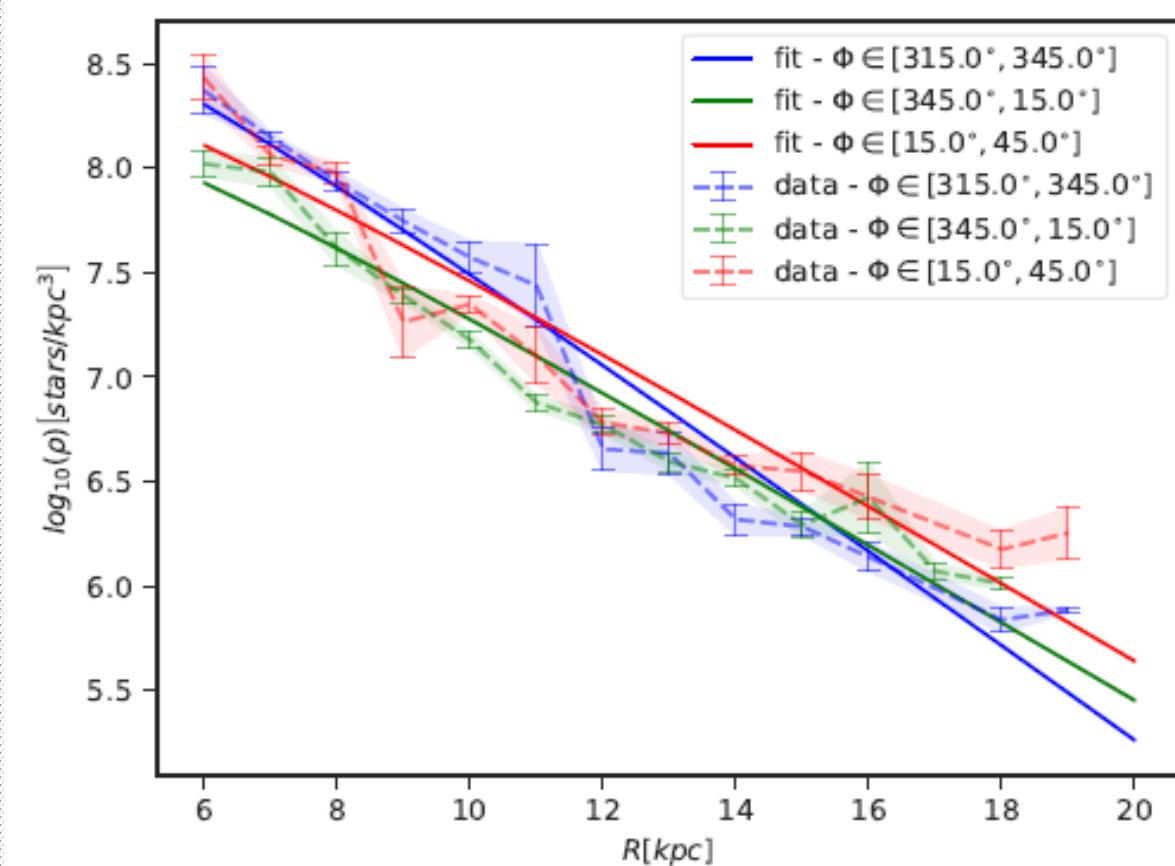
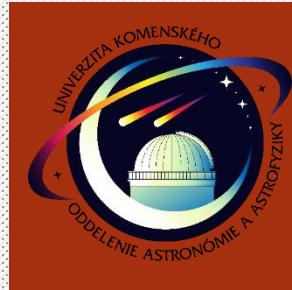
Structure of the outer Galactic - density maps



$30^\circ < \Phi < 60^\circ$

$300^\circ < \Phi < 330^\circ$

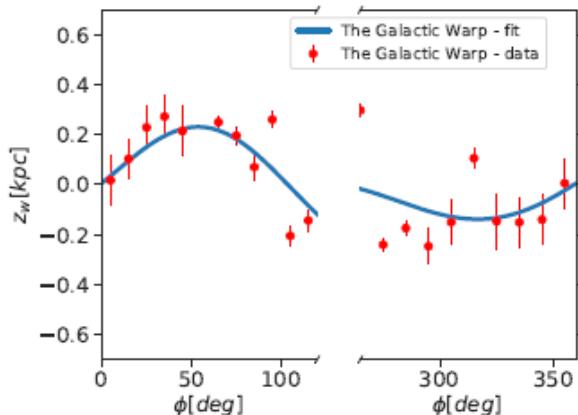
Structure of the outer Galactic disc with Gaia DR2 - density



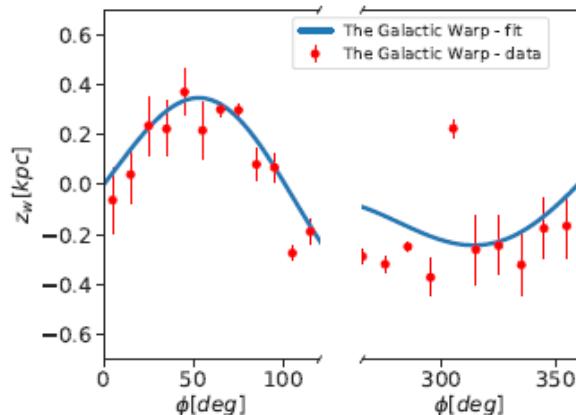
Structure of the outer Galactic disc with Gaia DR2 - warp



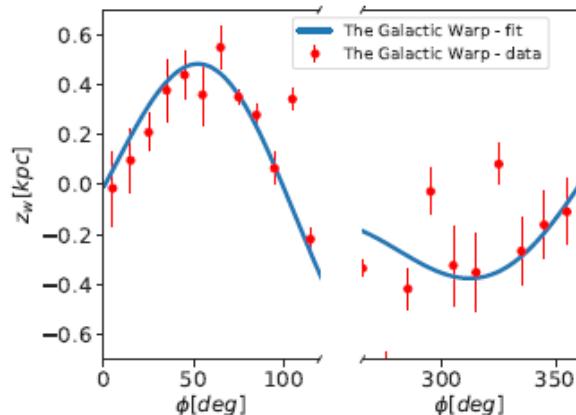
- Galactic warp - amplitude



(a)

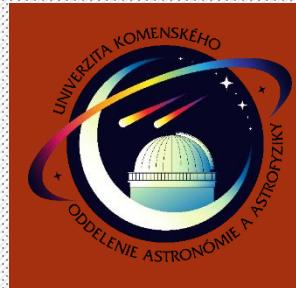


(b)

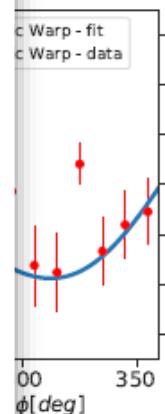
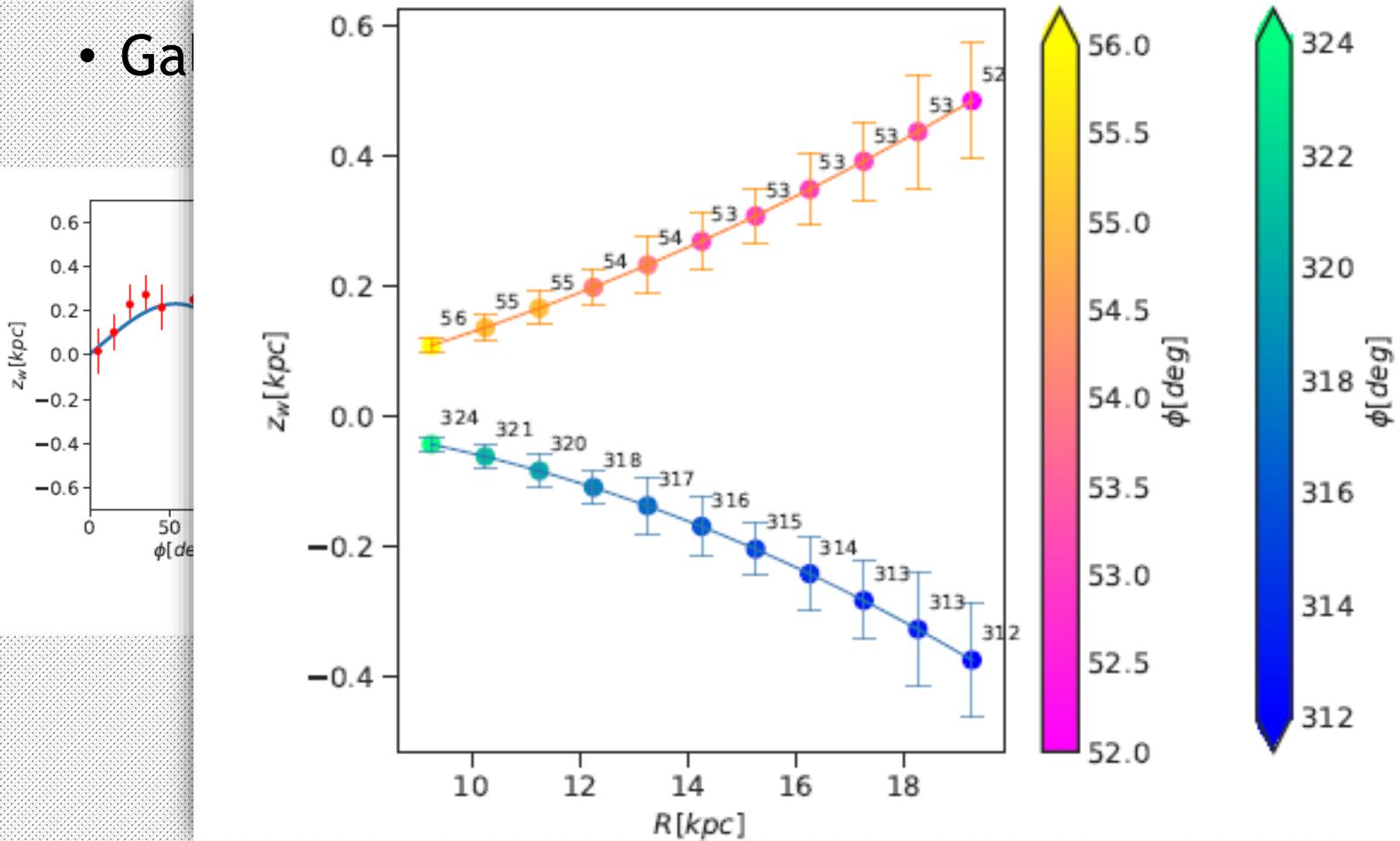


(c)

Structure of the outer Galactic disc with Gaia DR2 - warp



• Ga



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Thank you for your attention

