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

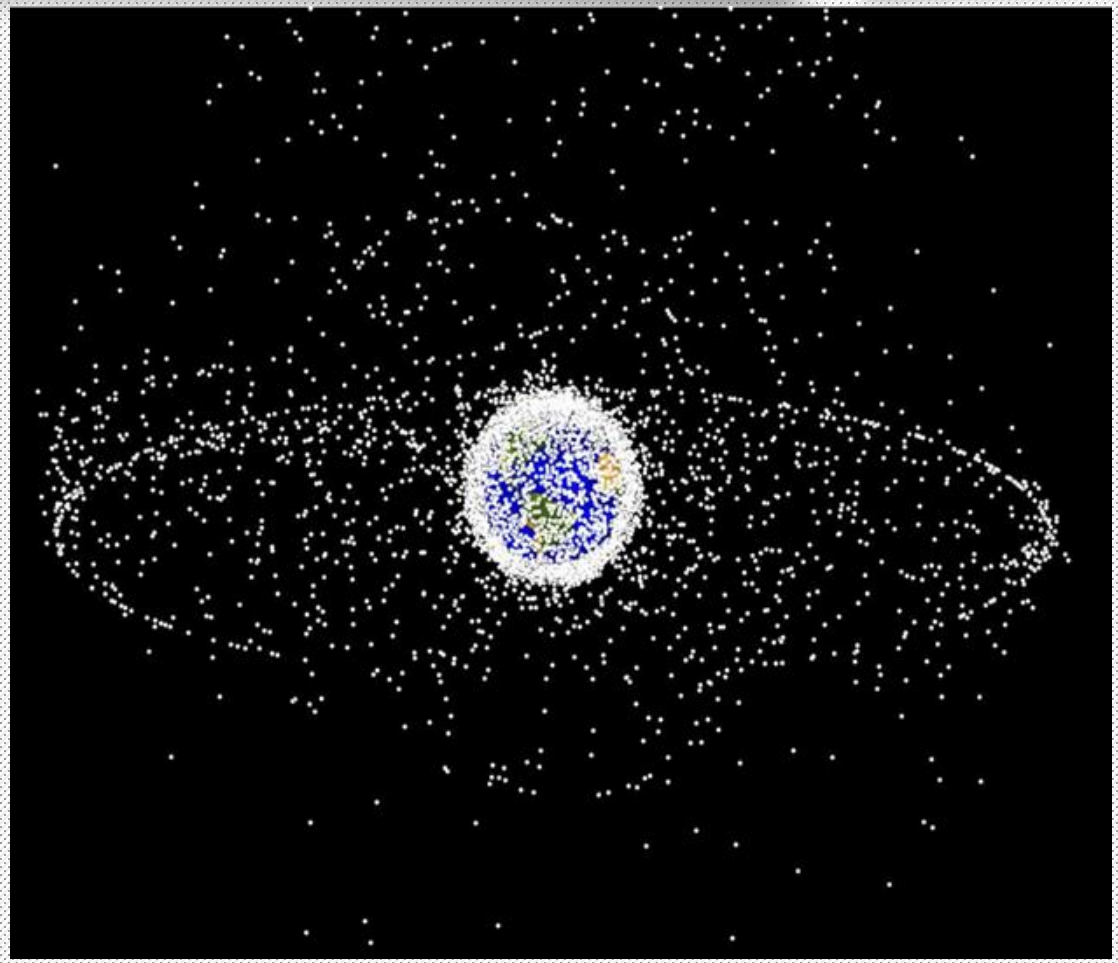
- Faculty of Mathematics, Physics and Informatics
- Department of Astronomy, Physics of the Earth, and Meteorology
- Division of Astronomy and Astrophysics

AGO Modra

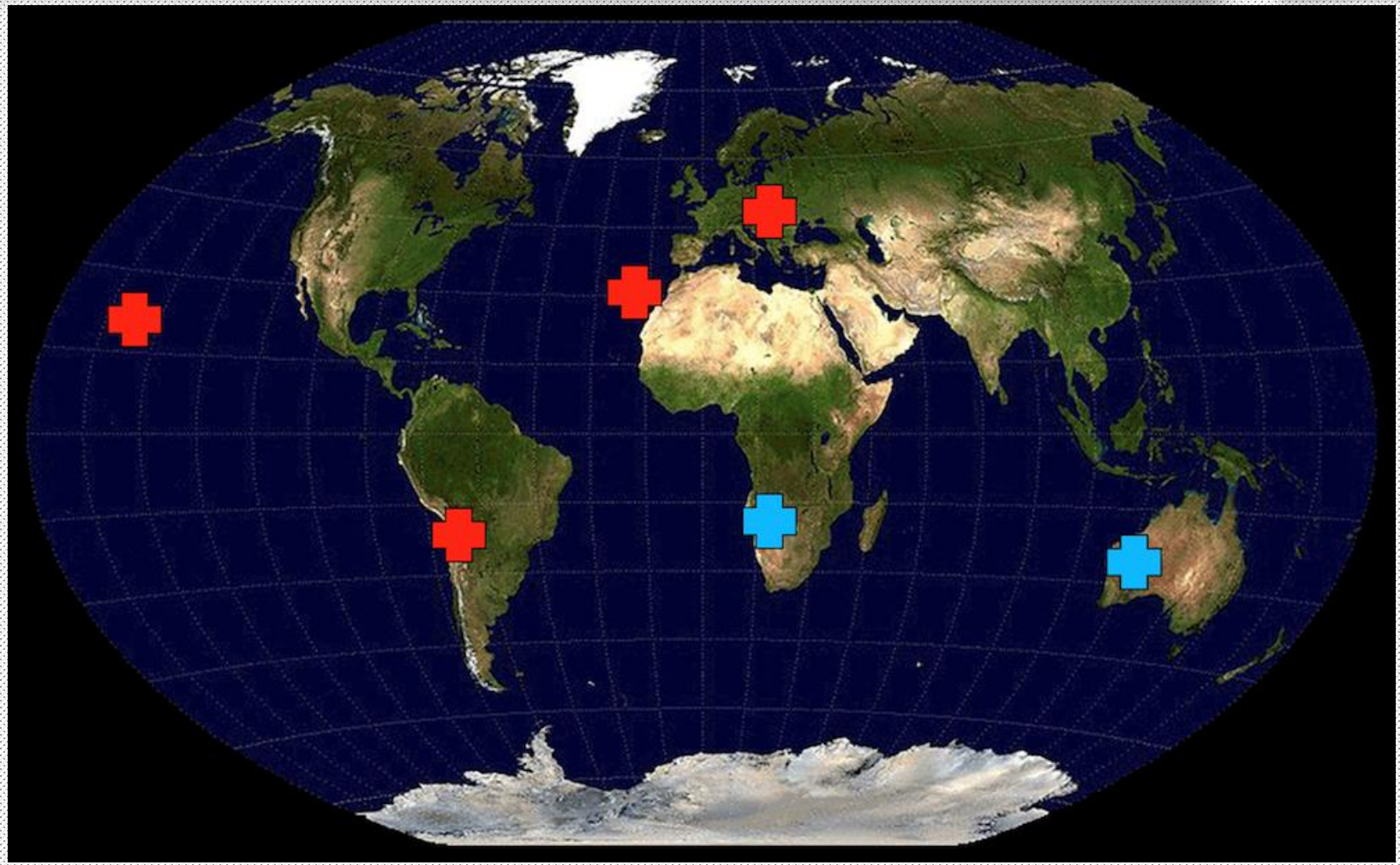
60 cm telescope

AGO Modra

70 cm telescope – space debris



AMOS



AMOS – Teide Observatory

Students and colleagues

Astronomy at Comenius University

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

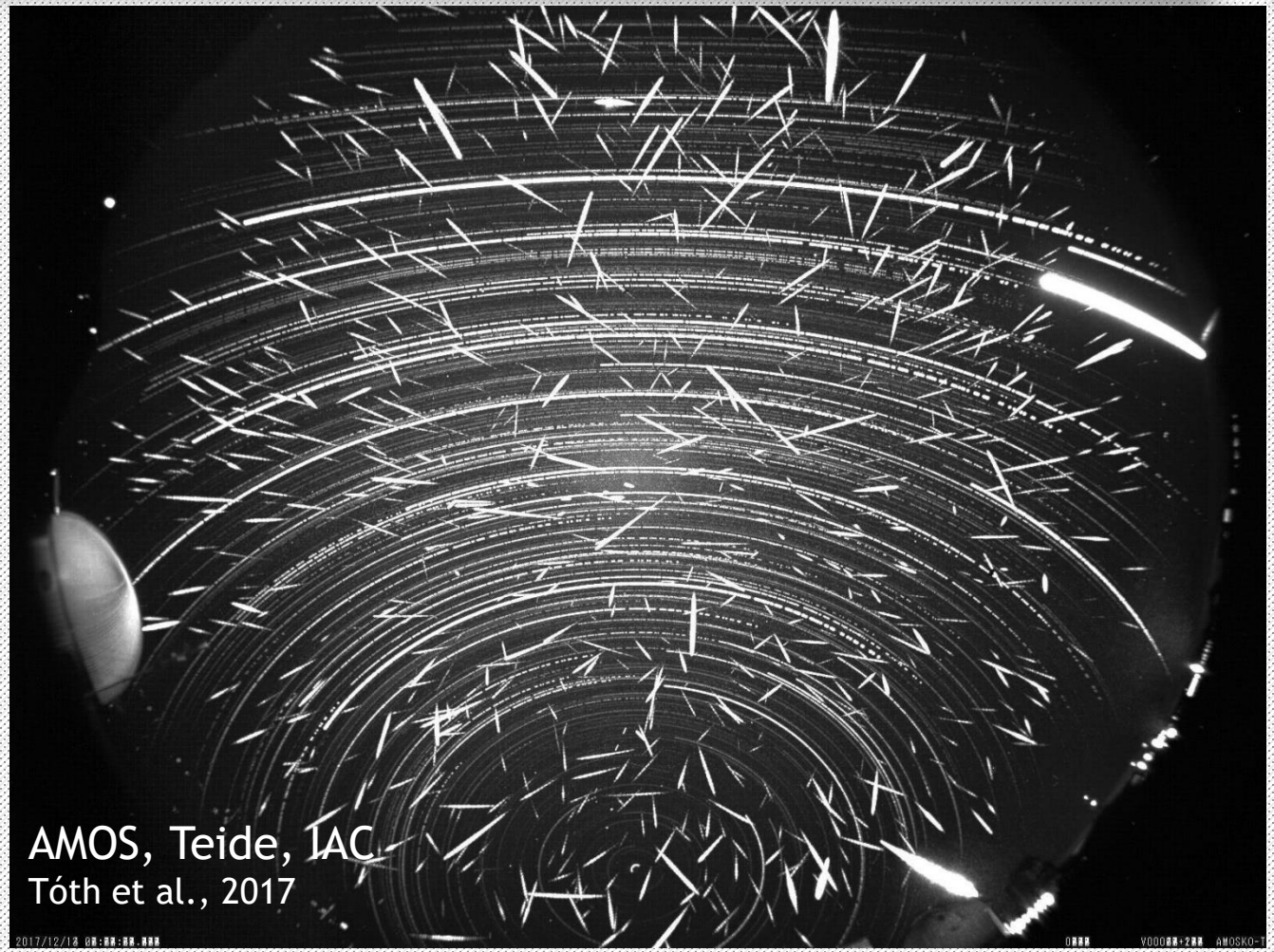
Interplanetary matter

- 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



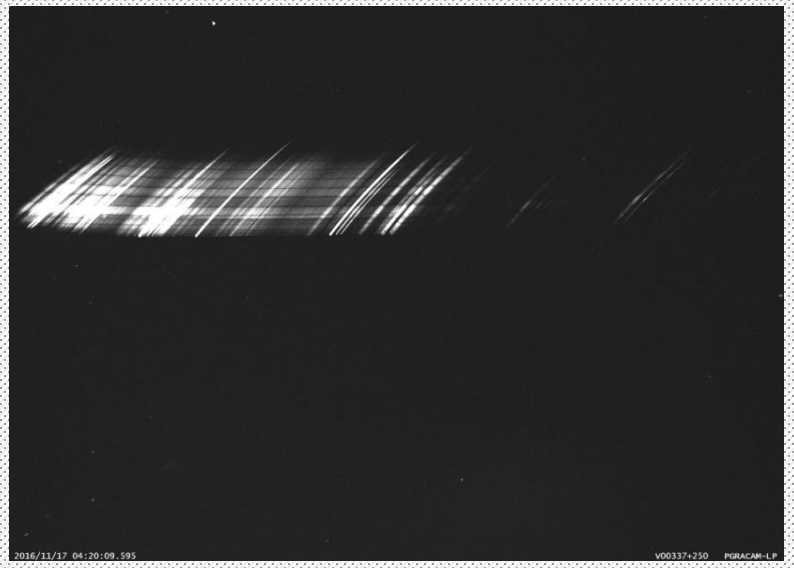
AMOS Spectral Instrumentation

AMOS-Spec

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

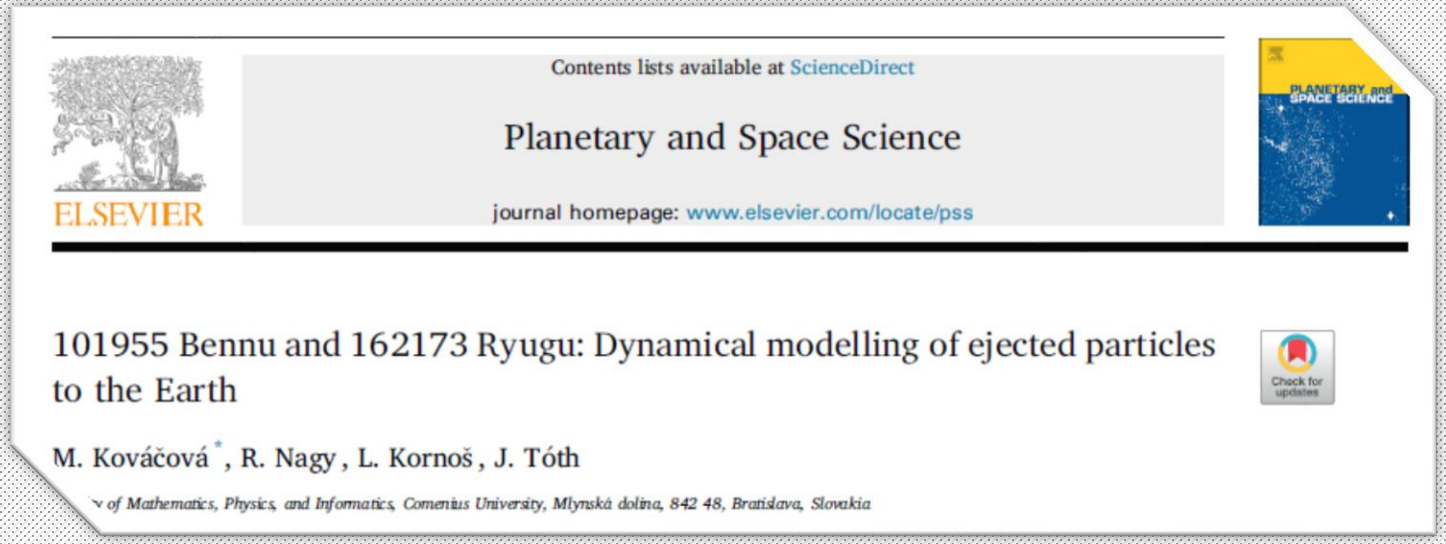
AMOS-HS

- 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



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

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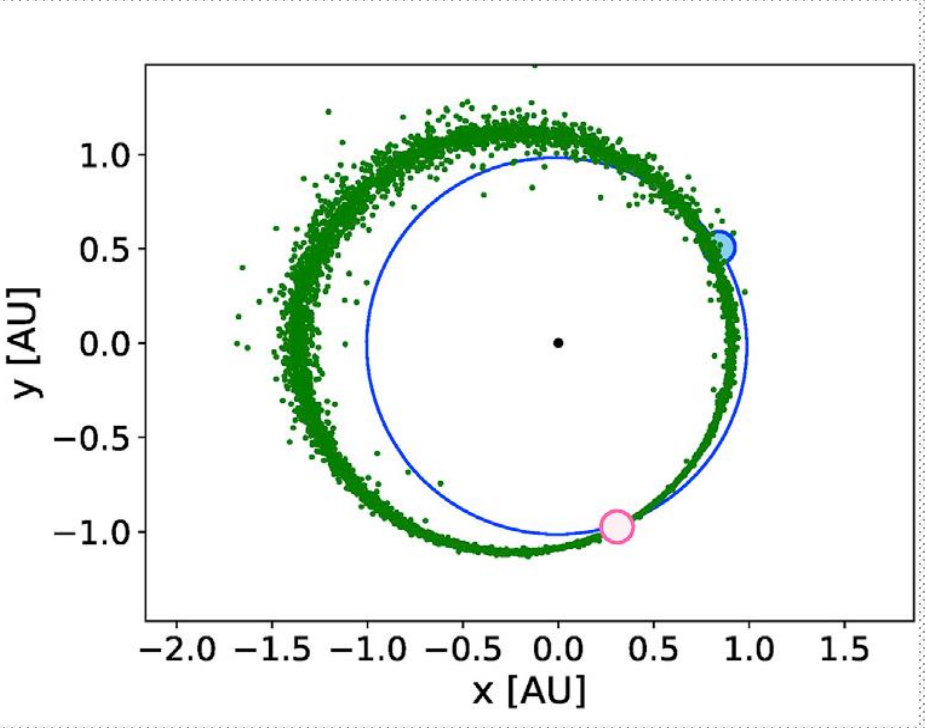
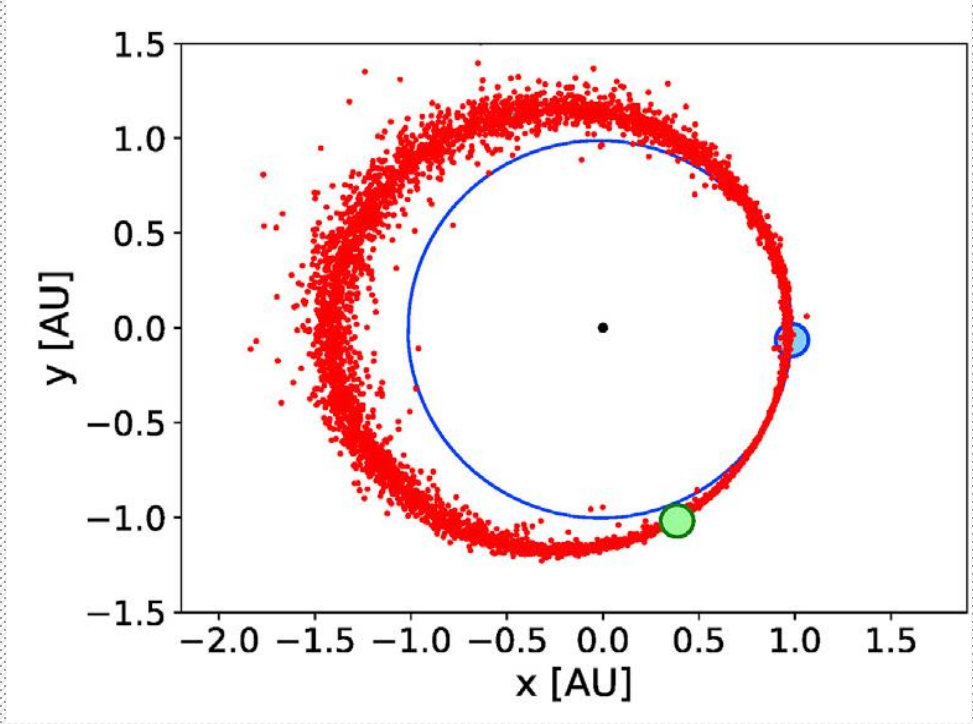
After 1000 yrs

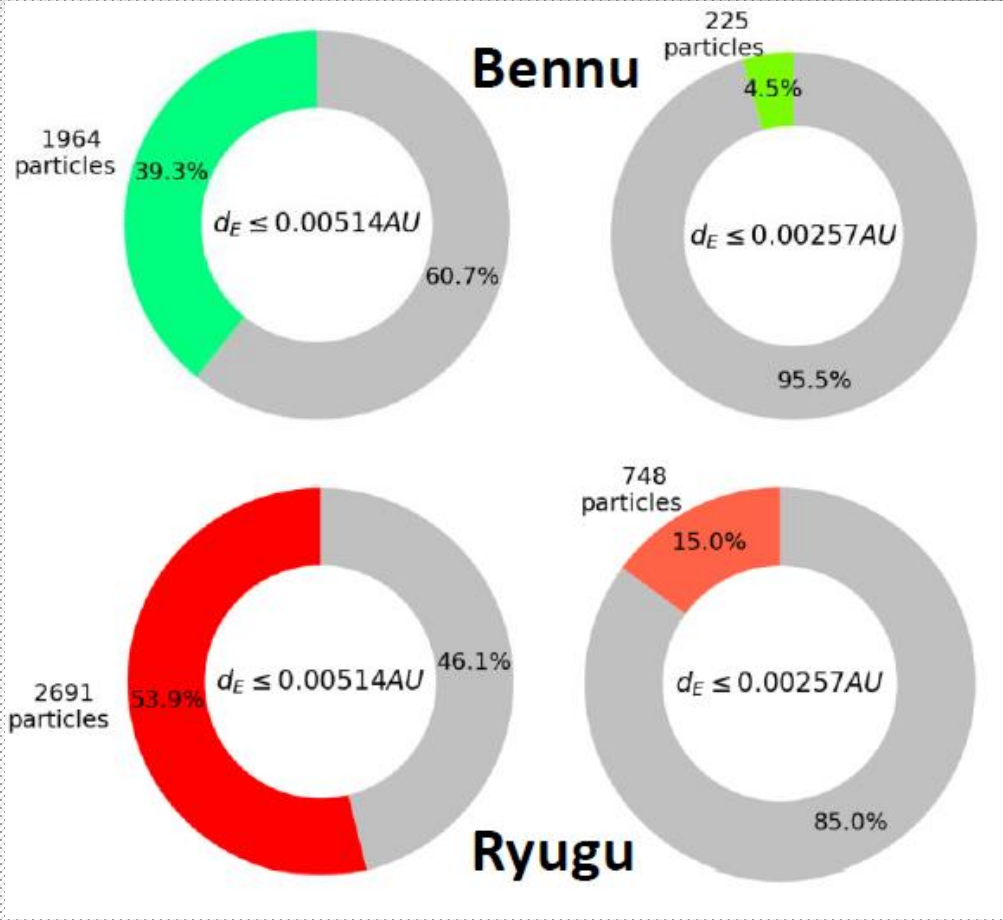


Bennu



Ryugu

Dynamical modelling

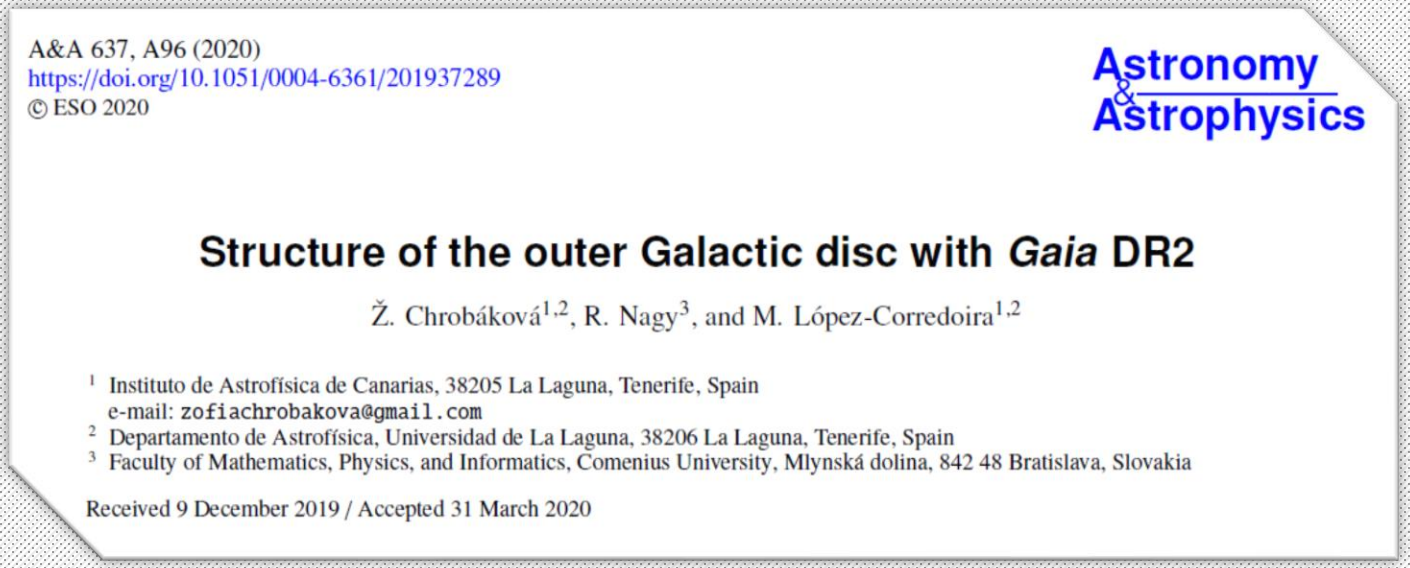


Galactic astrophysics

- 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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Astronomy & Astrophysics

Structure of the outer Galactic disc with *Gaia* DR2

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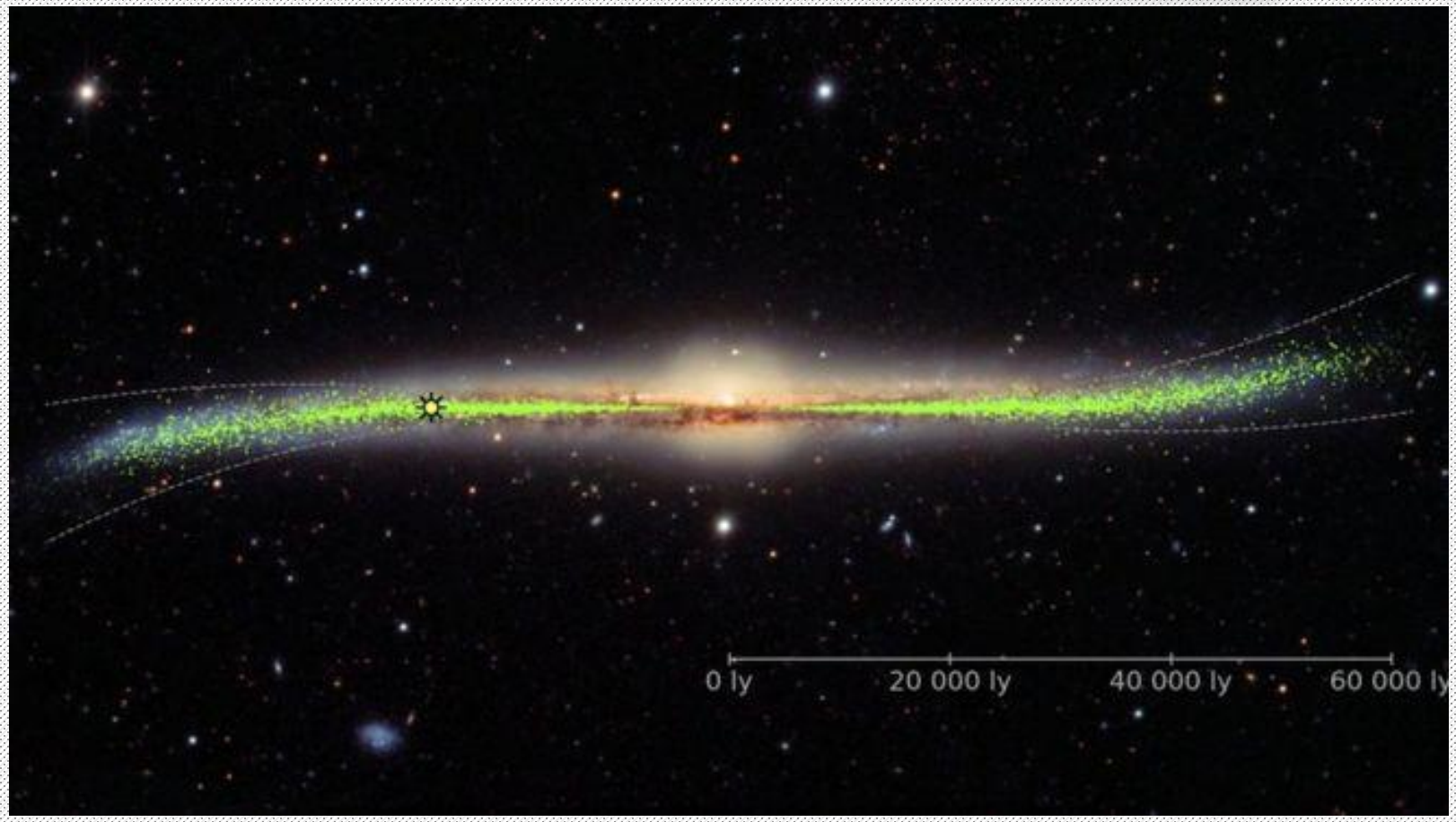
Structure of the outer Galactic disc with Gaia DR2 - warp



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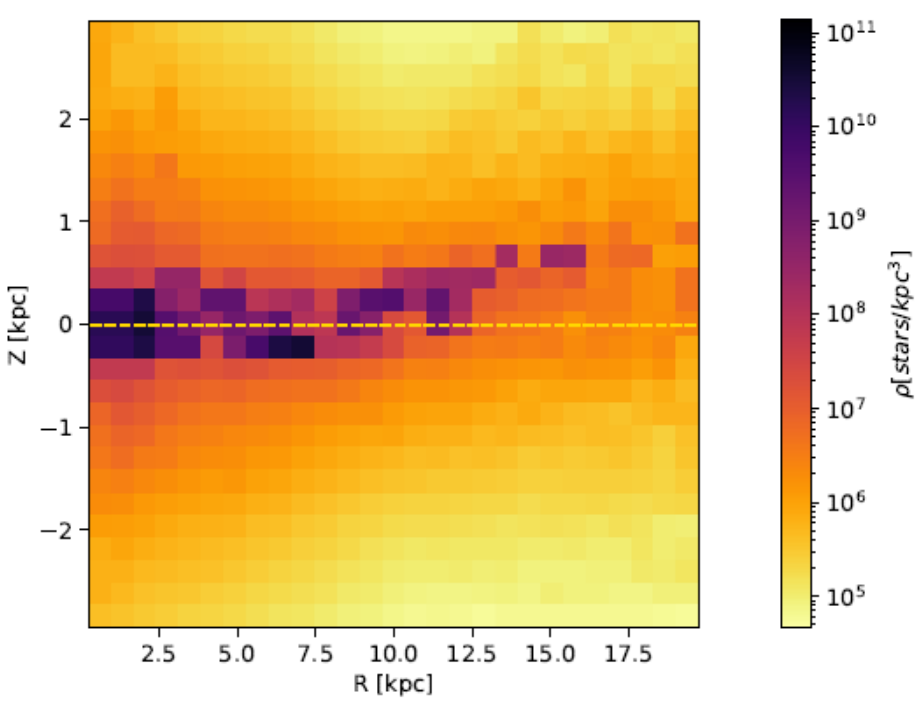
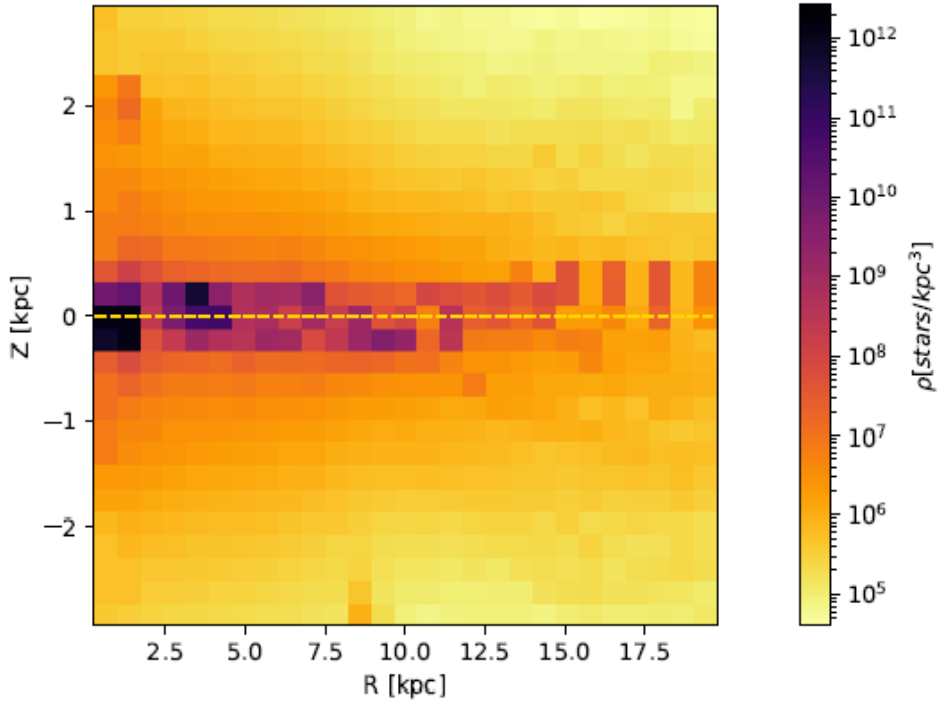
Structure of the outer Galactic – density maps

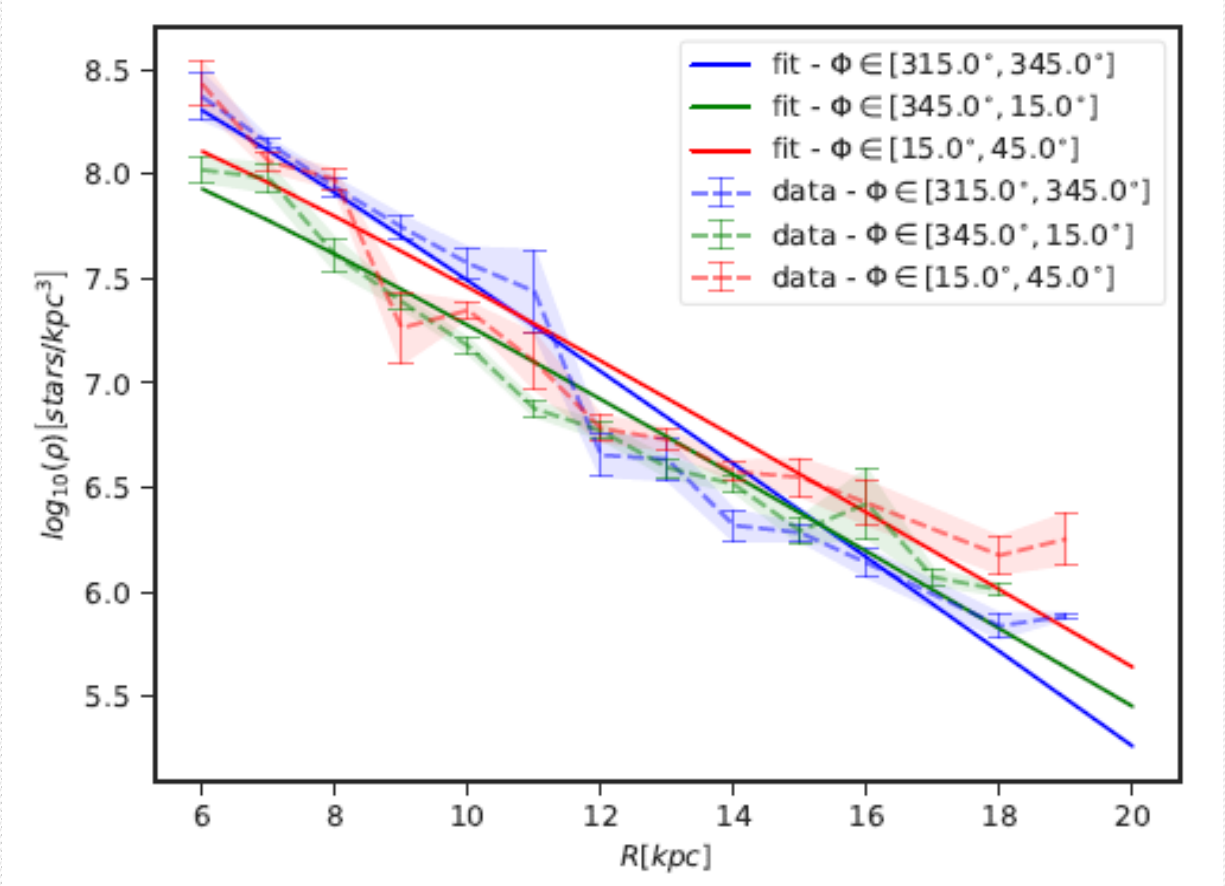


$30^\circ < \Phi < 60^\circ$



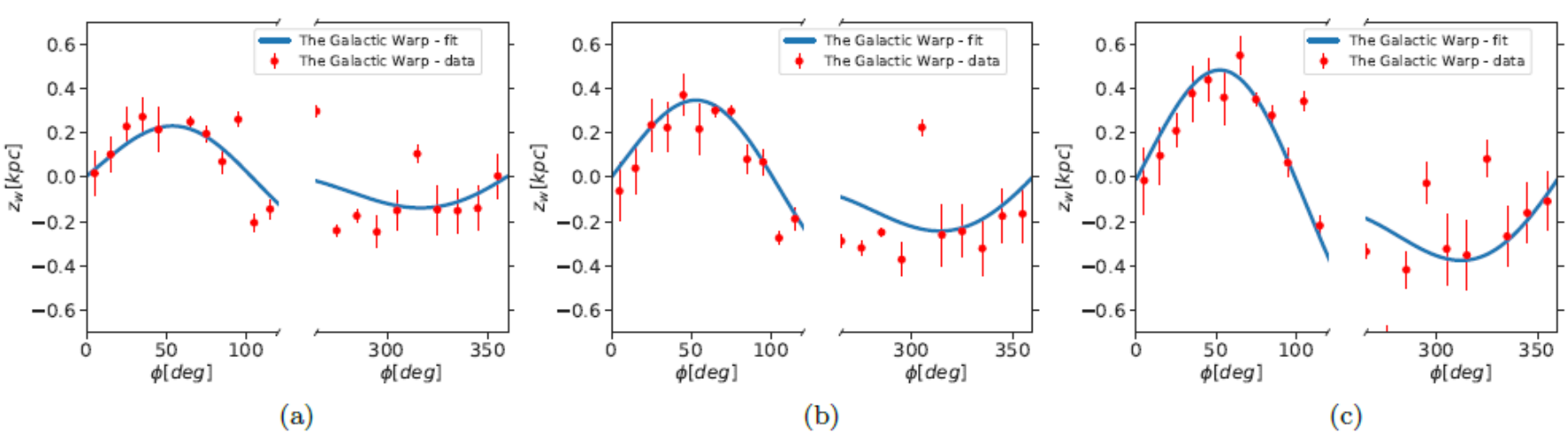
$300^\circ < \Phi < 330^\circ$

Structure of the outer Galactic disc with Gaia DR2 - density



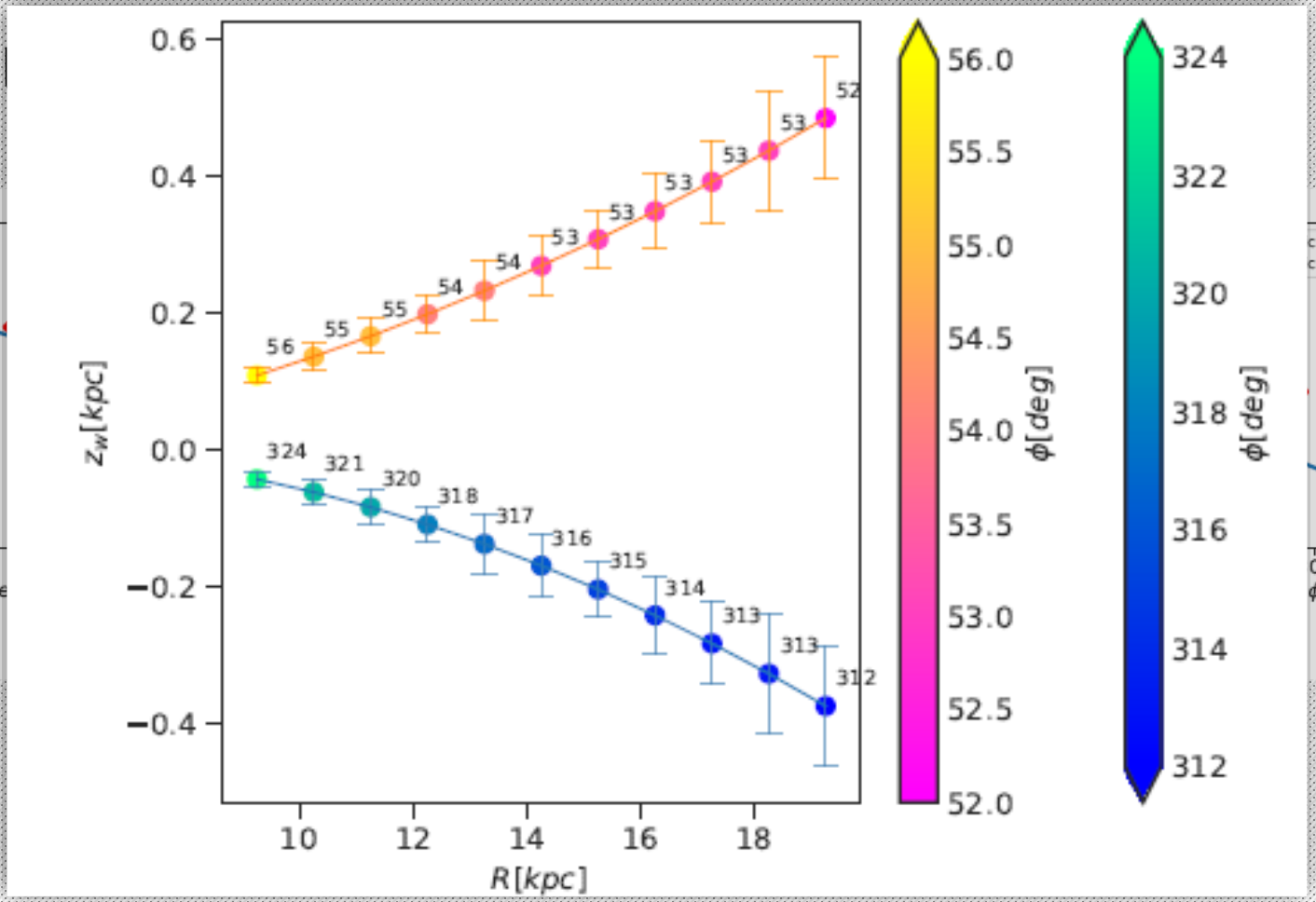
Structure of the outer Galactic disc with Gaia DR2 - warp

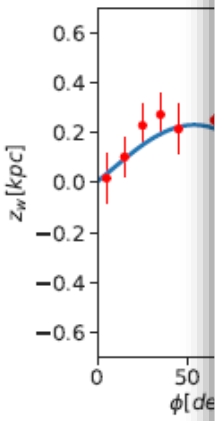
- Galactic warp – amplitude

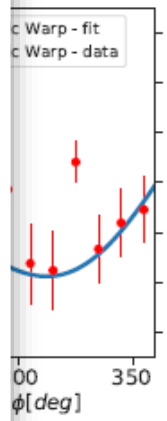


Structure of the outer Galactic disc with Gaia DR2 - warp

- Ga







Thank you for your attention