Hubble Parameter Estimation With CORN

Nicola Principi Cavaterra
Collaborators:
Krzysztof Lisiecki, Agnieszka Pollo,
Chiara Spiniello, Laura Hunt, Marek Biesiada

CosmoVerseSchool@Sofia
28/05/2026

NARODOWE CENTRUM BADAŃ JĄDROWYCH ŚWIERK

With no assumptions on cosmology...

With no assumptions on cosmology...

$$H(z) = \frac{\dot{a}}{a} = -\frac{1}{1+z}\frac{\mathrm{d}z}{\mathrm{d}t}$$

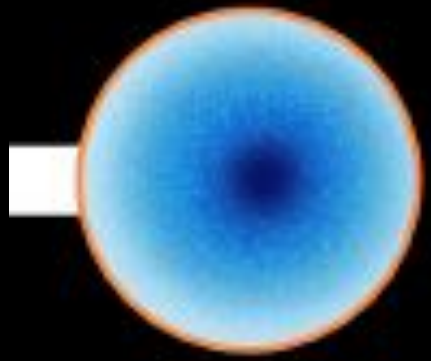
With no assumptions on cosmology...

$$H(z) = \frac{\dot{a}}{a} = -\frac{1}{1+z}\frac{\mathrm{d}z}{\mathrm{d}t}$$

We need a population of synchronised tracers

We need a population of synchronised tracers

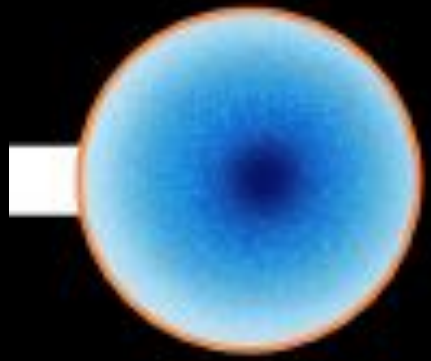
Massive & Passive galaxies



Local giant
early-type
galaxy

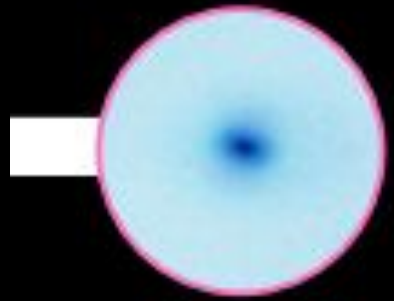
vs

Spiniello+21



Local giant
early-type
galaxy

VS



RELICS!!

Spiniello+21

$$\mathrm{Cov}_{ij}^{\mathrm{tot}} = \mathrm{Cov}_{ij}^{\mathrm{stat}} + \mathrm{Cov}_{ij}^{\mathrm{met}} + \mathrm{Cov}_{ij}^{\mathrm{young}} + \mathrm{Cov}_{ij}^{\mathrm{SFH}} + \mathrm{Cov}_{ij}^{\mathrm{IMF}} + \mathrm{Cov}_{ij}^{\mathrm{st.lib.}} + \mathrm{Cov}_{ij}^{\mathrm{SPS}}$$

10% σ

2% σ

3% σ

1%σ

7% σ

5% σ

$$\mathrm{Cov}_{ij}^{\mathrm{tot}} = \mathrm{Cov}_{ij}^{\mathrm{stat}} + \mathrm{Cov}_{ij}^{\mathrm{met}} + \mathrm{Cov}_{ij}^{\mathrm{young}} + \mathrm{Cov}_{ij}^{\mathrm{SFH}} + \mathrm{Cov}_{ij}^{\mathrm{IMF}} + \mathrm{Cov}_{ij}^{\mathrm{st.lib.}} + \mathrm{Cov}_{ij}^{\mathrm{SPS}}$$

10% σ

1%σ

7% σ

5% σ

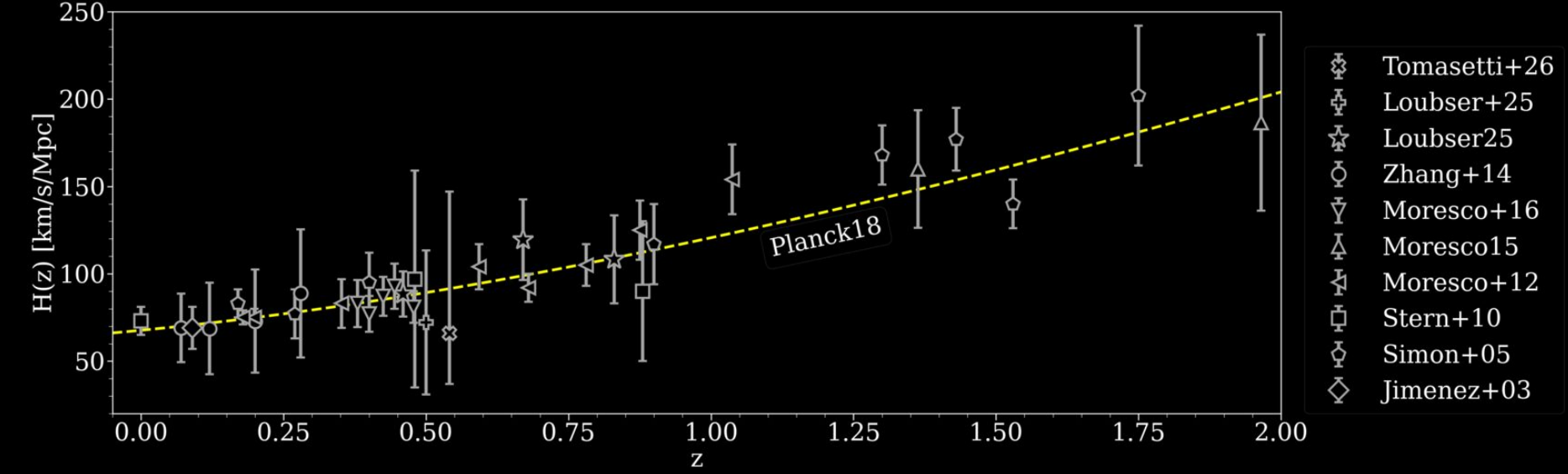
$$\mathrm{Cov}_{ij}^{\mathrm{tot}} = \mathrm{Cov}_{ij}^{\mathrm{stat}} + \mathrm{Cov}_{ij}^{\mathrm{met}} + \mathrm{Cov}_{ij}^{\mathrm{young}} + \mathrm{Cov}_{ij}^{\mathrm{SFH}} + \mathrm{Cov}_{ij}^{\mathrm{IMF}} + \mathrm{Cov}_{ij}^{\mathrm{st.lib.}} + \mathrm{Cov}_{ij}^{\mathrm{SPS}}$$

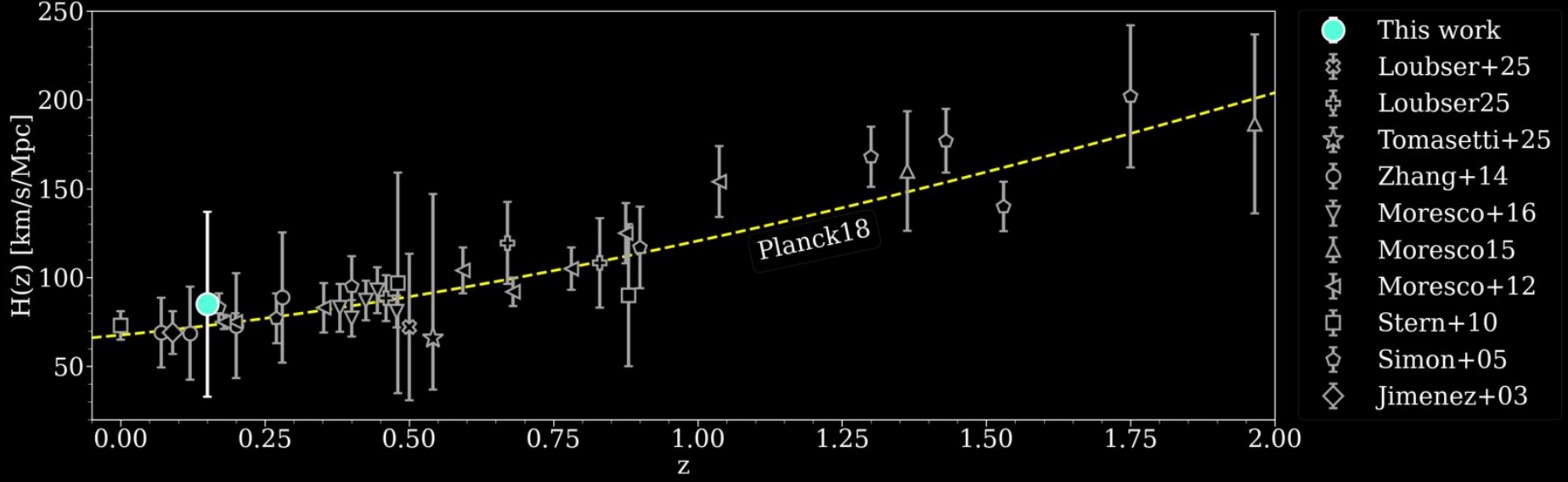
1%σ

1%σ

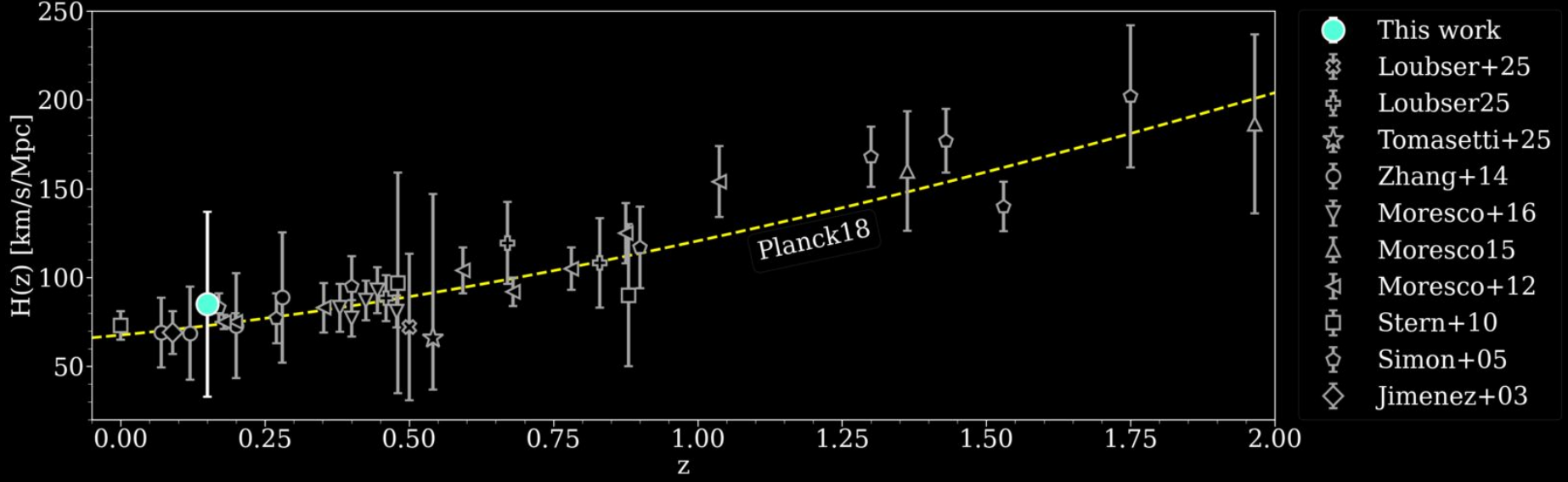
7% σ

5% σ


H(z) [km/s/Mpc]
z
Planck18
Tomasetti+26
Loubser+25
Loubser25
Zhang+14
Moresco+16
Moresco15
Moresco+12
Stern+10
Simon+05
Jimenez+03

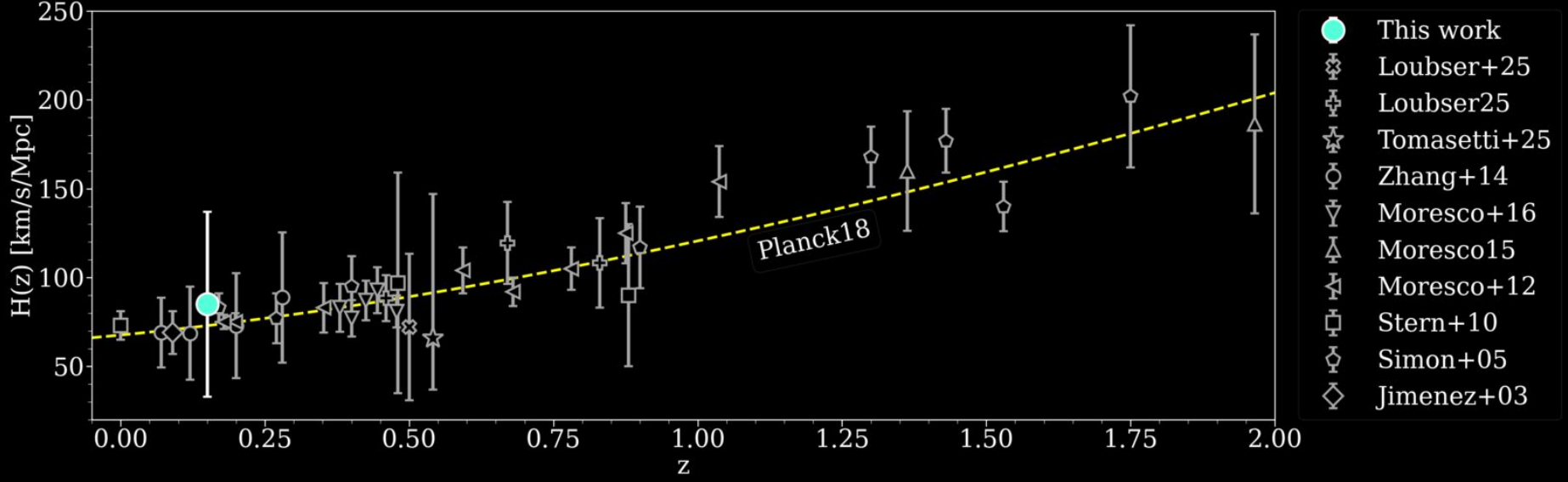


Lisiecki, Principi Cavaterra et al. (submitted)



Lisiecki, Principi Cavaterra et al. (submitted)

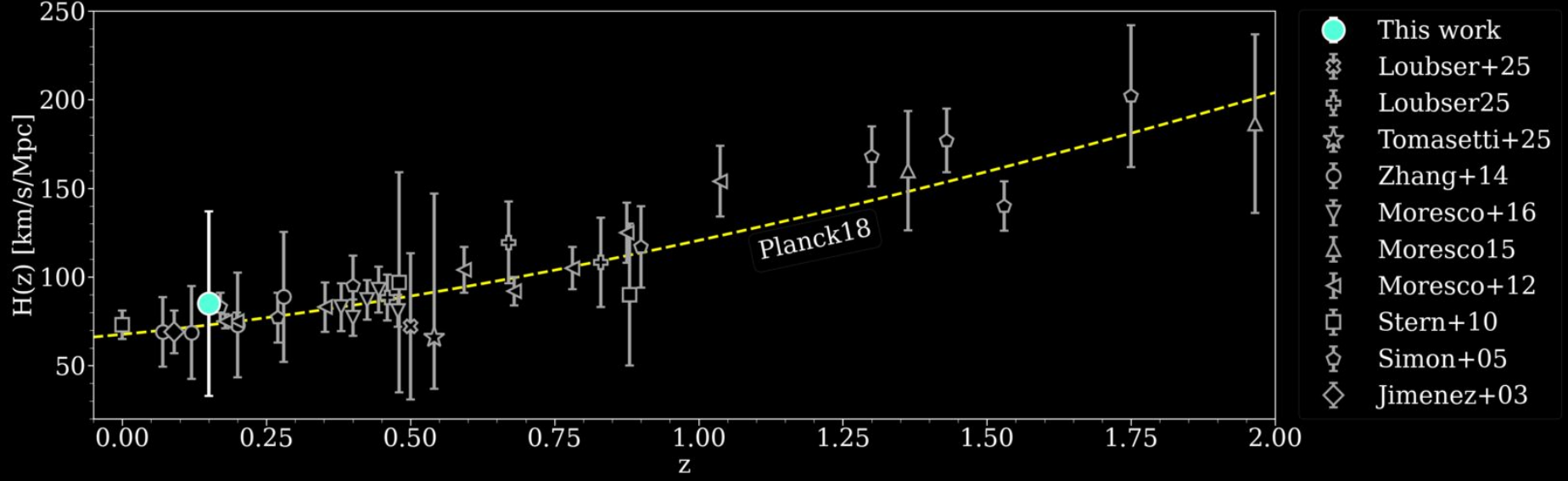
RELICS ARE PROMISING!



Lisiecki, Principi Cavaterra et al. (submitted)

RELICS ARE PROMISING!

SOON BIGGER DATASETS



Lisiecki, Principi Cavaterra et al. (submitted)

RELICS ARE PROMISING!

SOON BIGGER DATASETS

nicola.principi@ncbj.gov.pl