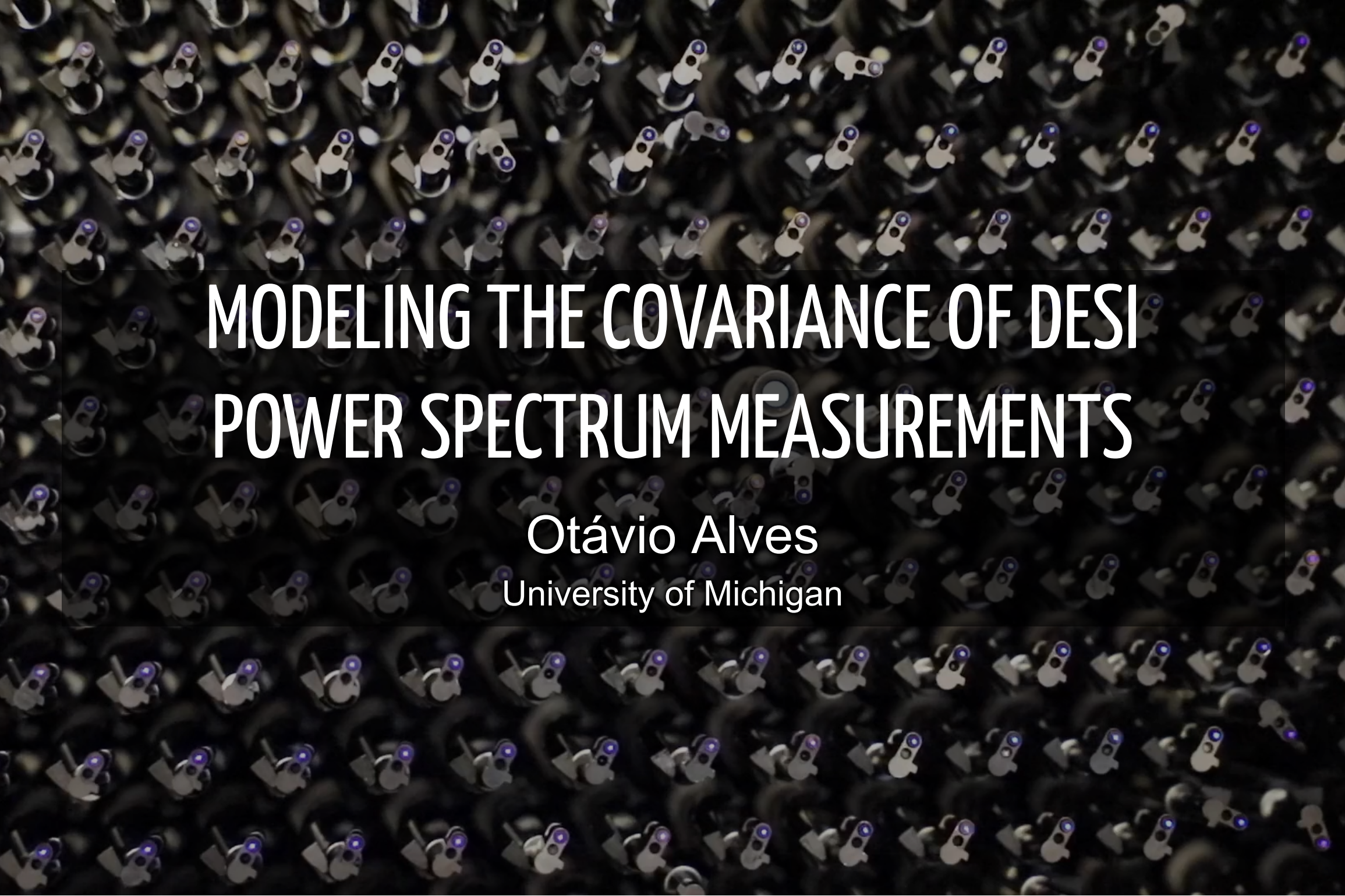
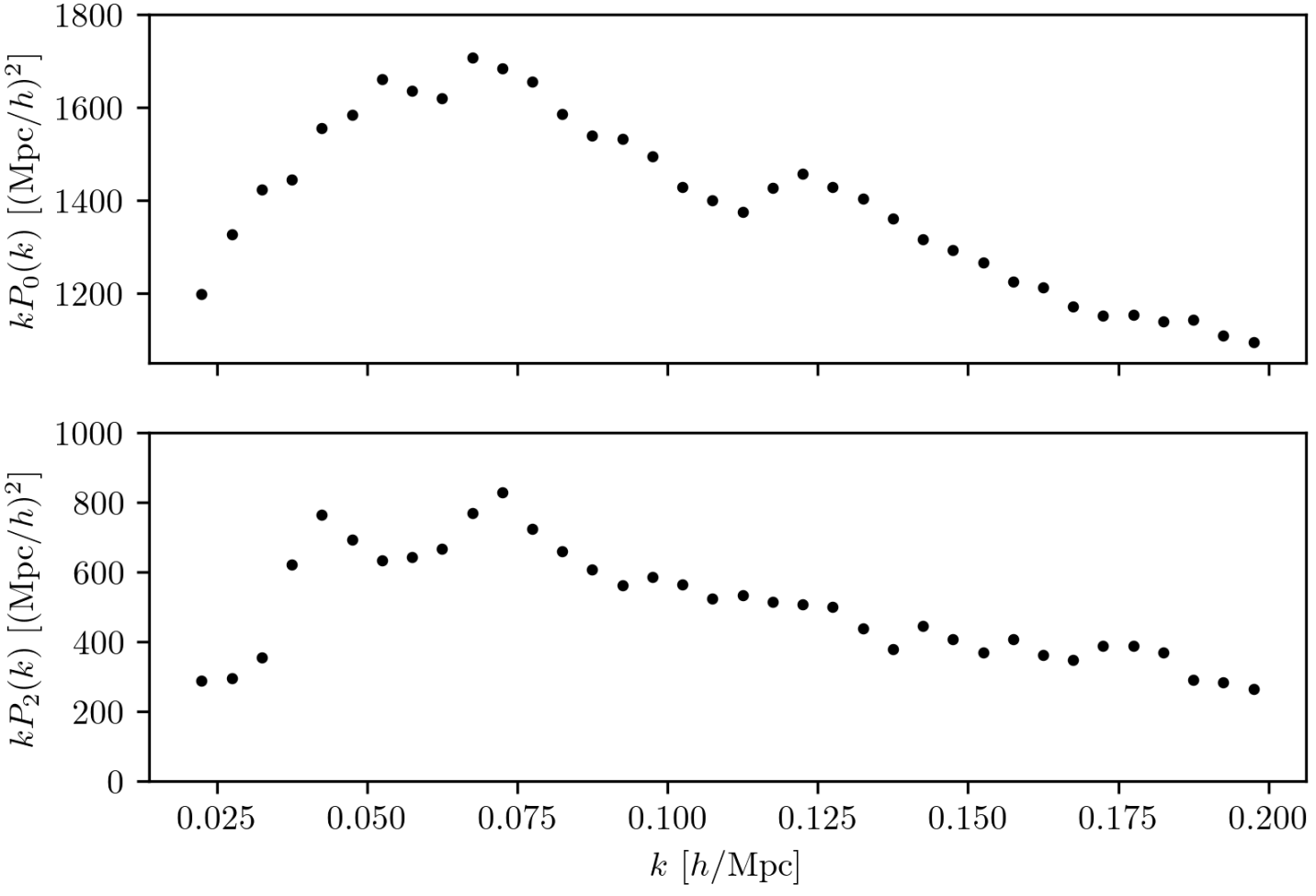
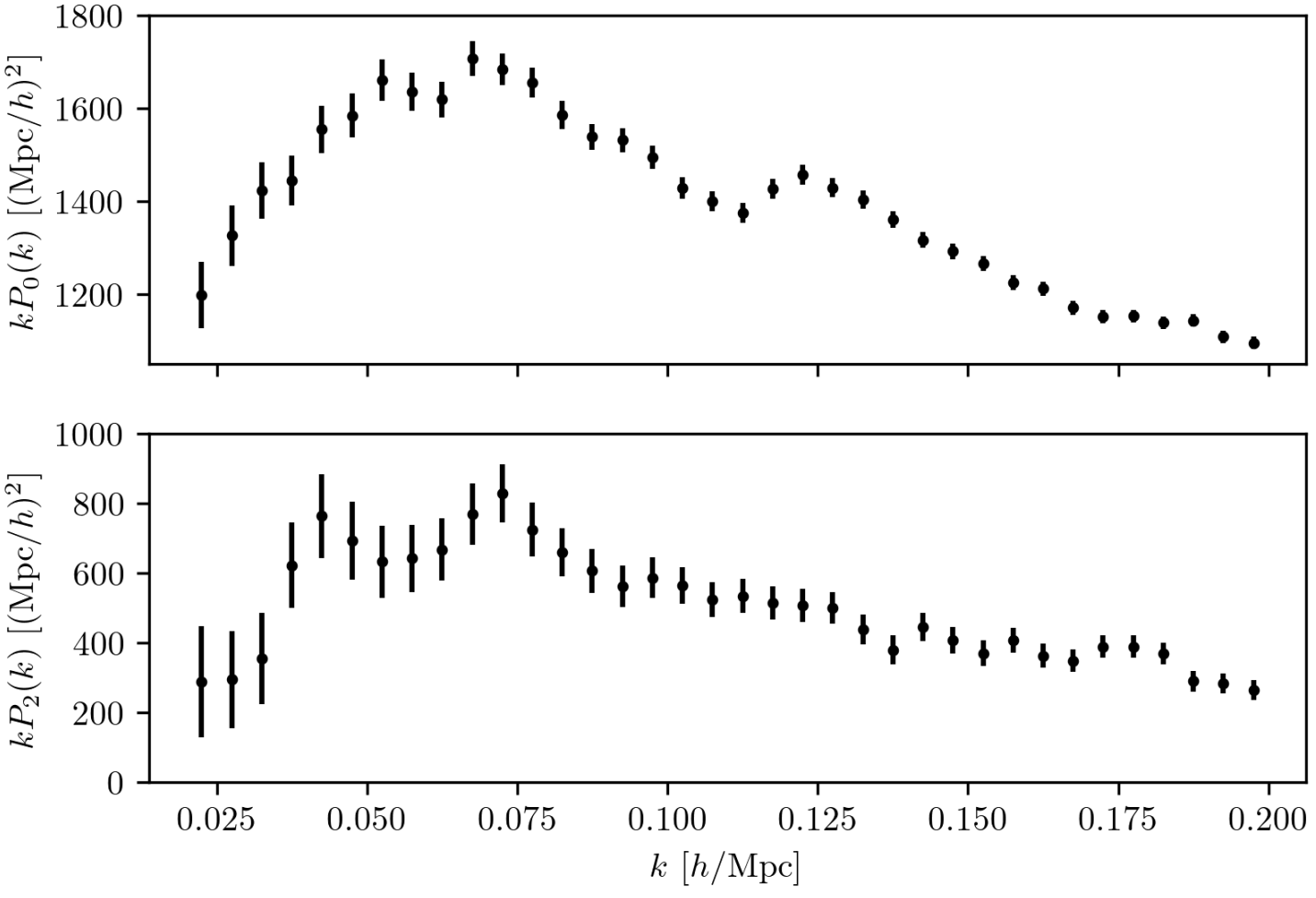


MODELING THE COVARIANCE OF DESI POWER SPECTRUM MEASUREMENTS

Otávio Alves

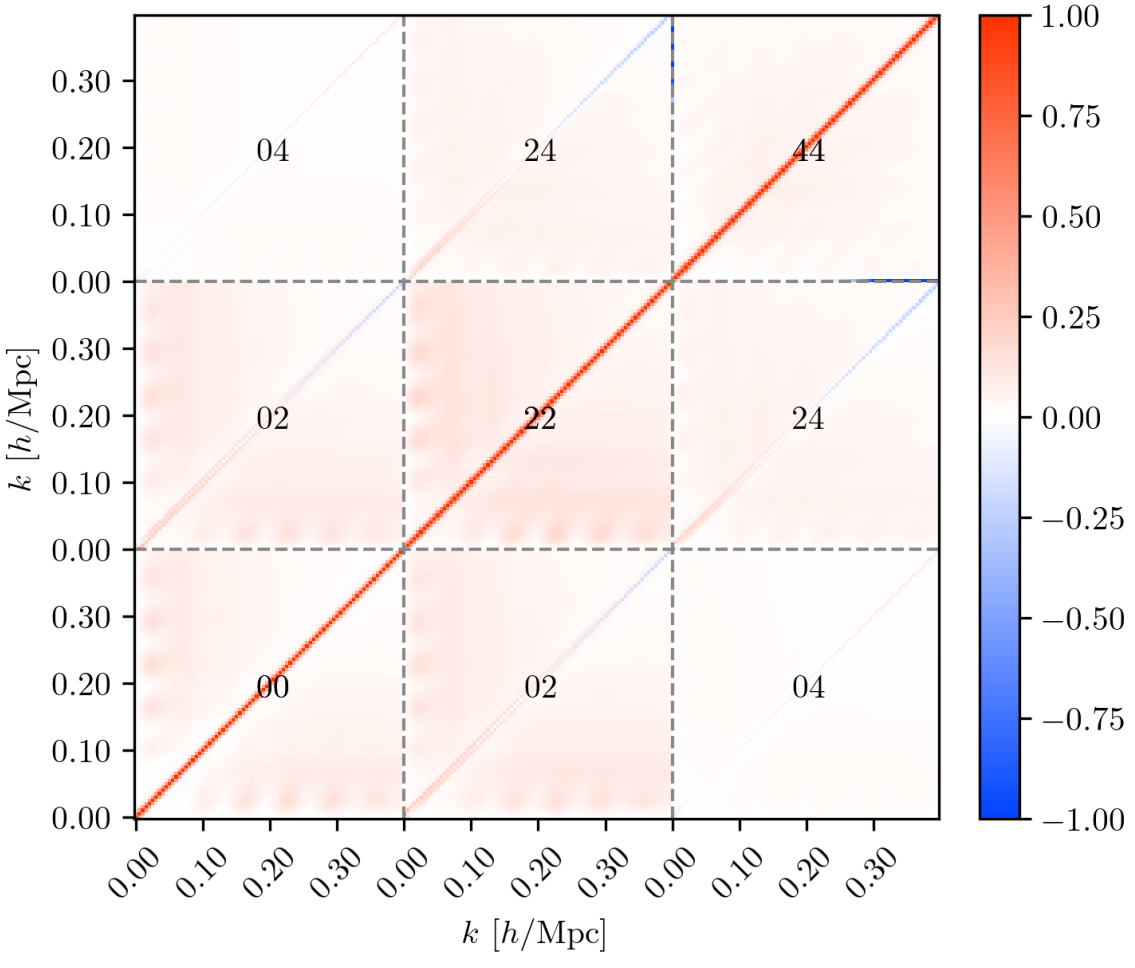
University of Michigan


1800
1600
1400
1200
$kP_0(k)$ [(Mpc/h)^2]
1000
800
600
400
200
0
$kP_2(k)$ [(Mpc/h)^2]
0.025
0.050
0.075
0.100
0.125
0.150
0.175
0.200
k [h/Mpc]



DESI DR1 covariance task

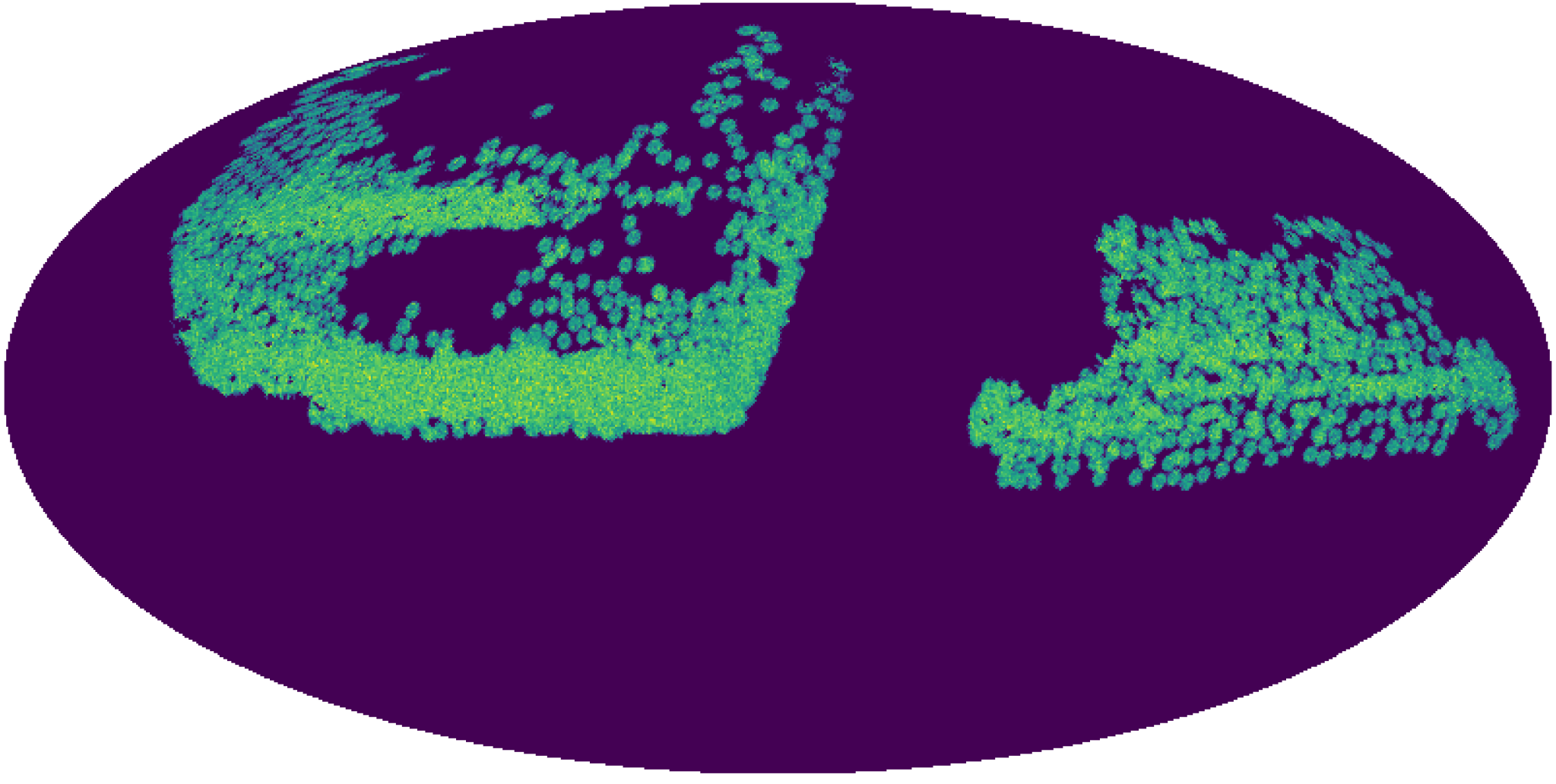
Co-leads: Otávio Alves, Misha Rashkovetskyi, Daniel Forero-Sánchez

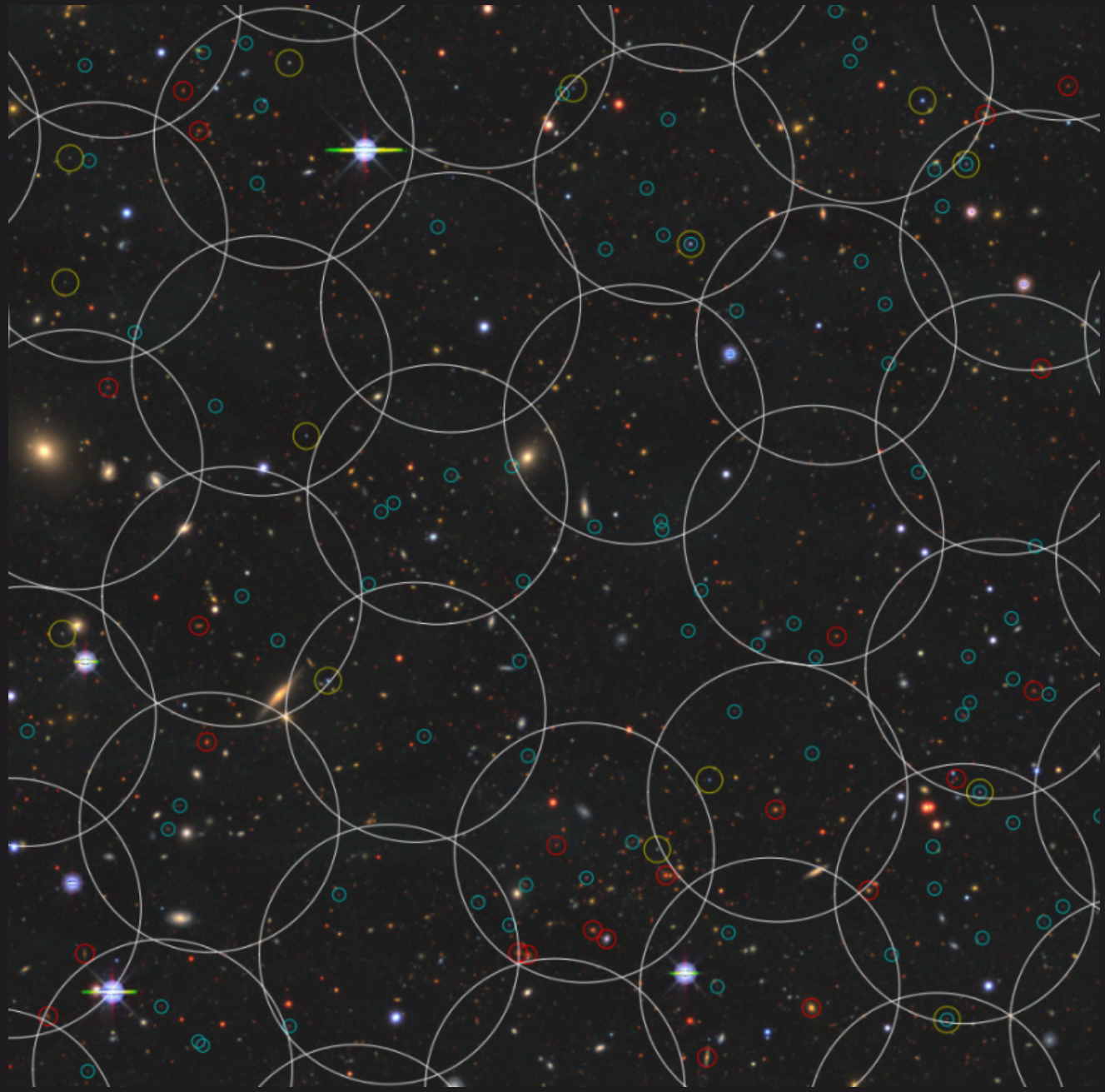


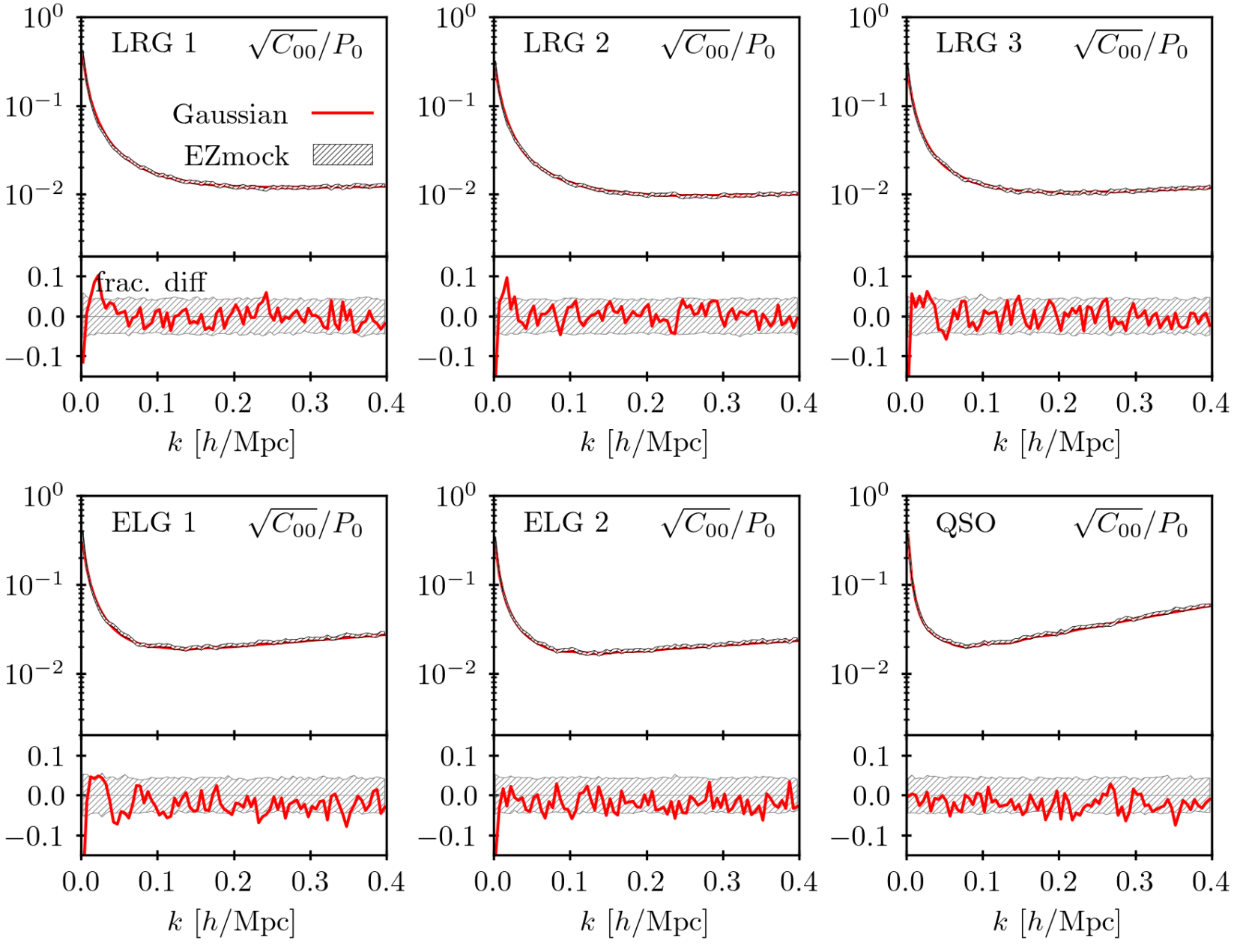
thecov

theoretical covariances of power spectrum multipoles

- Based on **Wadekar & Scoccimarro 2019**.
- Trispectrum at tree-level using **Kobayashi 2023**.

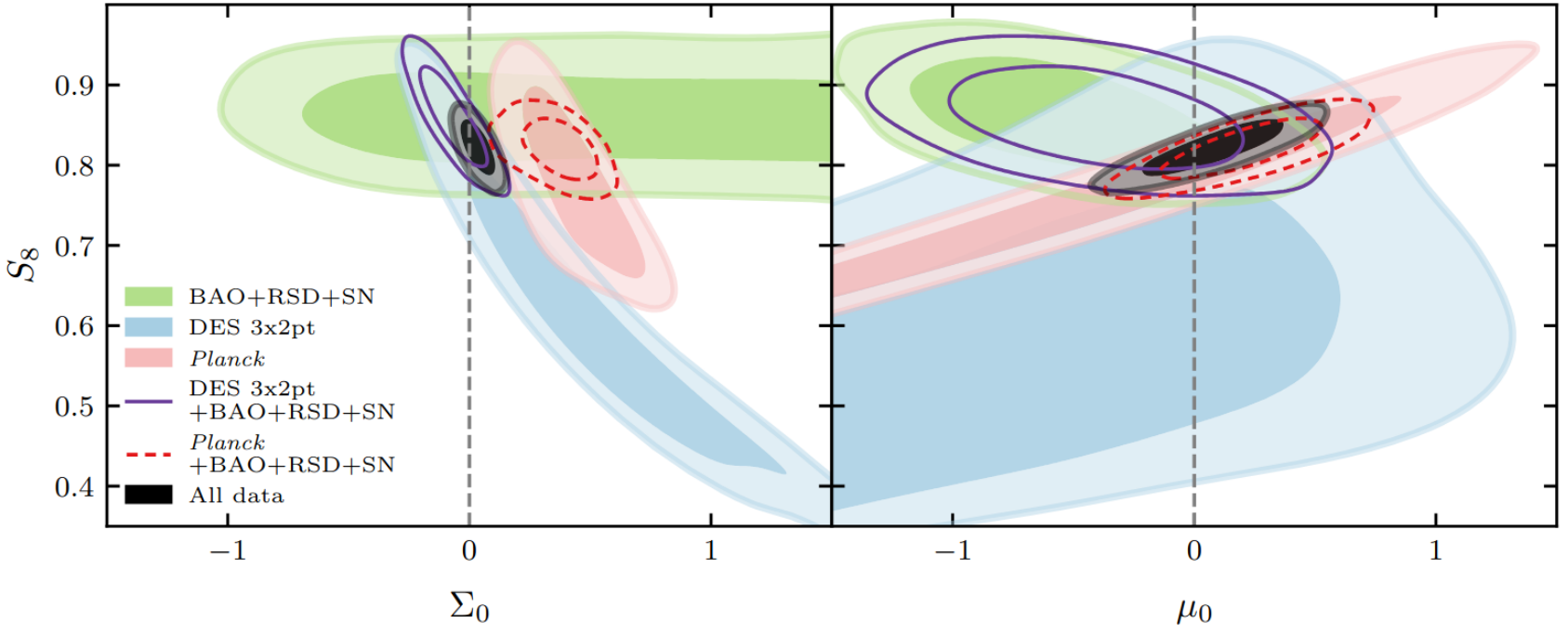





LRG 1
$\sqrt{C_{00}}/P_0$
Gaussian
EZmock
frac. diff
LRG 2
$\sqrt{C_{00}}/P_0$
LRG 3
$\sqrt{C_{00}}/P_0$
ELG 1
$\sqrt{C_{00}}/P_0$
ELG 2
$\sqrt{C_{00}}/P_0$
QSO
$\sqrt{C_{00}}/P_0$
10^0
10^{-1}
10^{-2}
0.1
0.0
−0.1
0.0 0.1 0.2 0.3 0.4
k [h/Mpc]

Dark Energy Survey Year 3 Results: Constraints on extensions to ΛCDM with weak lensing and galaxy clustering

Co-leads: Agnès Ferté, Jessie Muir



Dark Energy Survey Year 6 Extensions

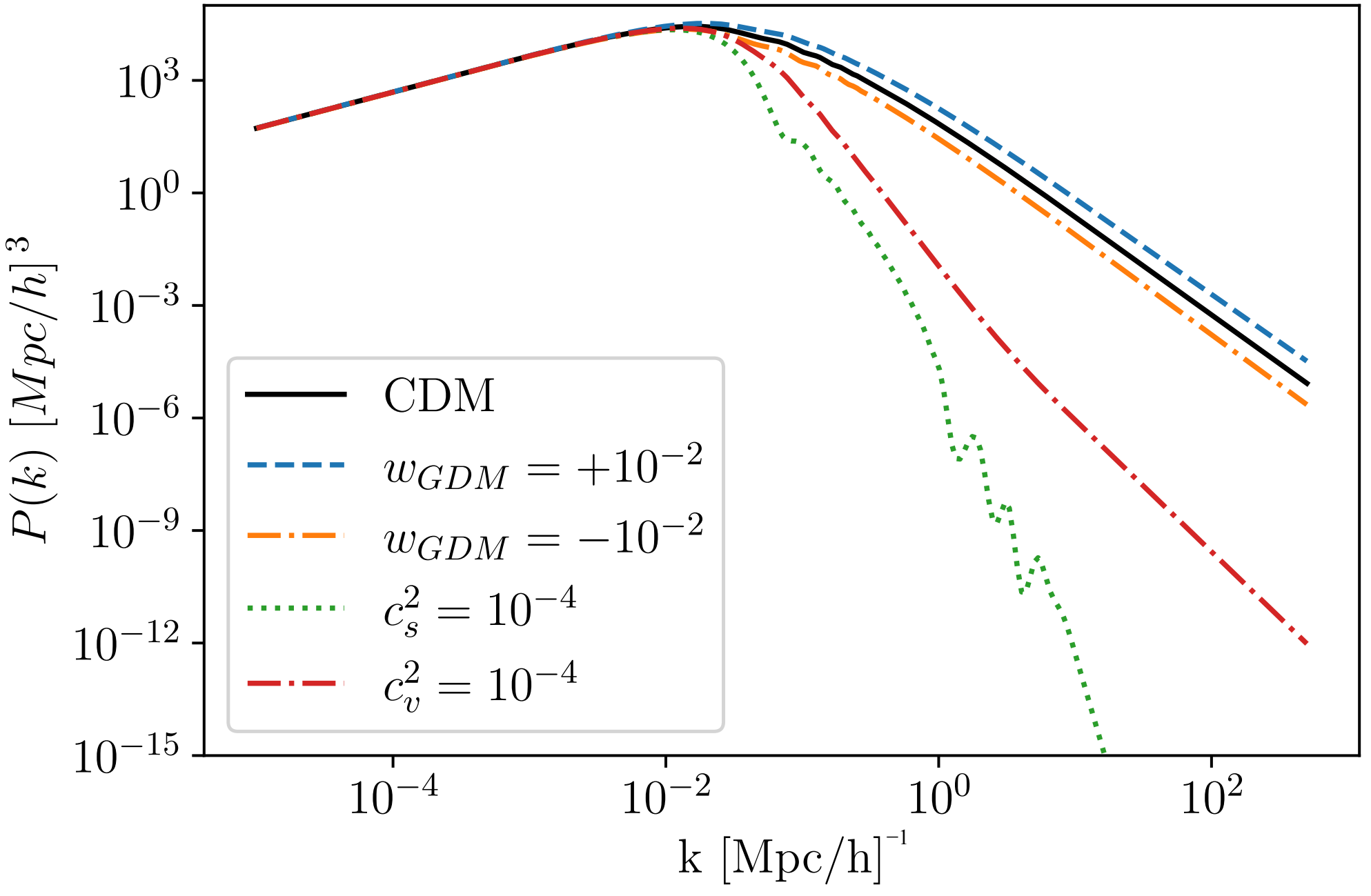
Co-leads: Otávio Alves, Sujeong Lee, Marco Raveri

Weyl potential

$$\Phi = \frac{\psi + \phi}{2}, \qquad \mathrm{d}s^2 = a(\tau)^2[-(1+2\psi)\mathrm{d}\tau^2 + (1-2\phi)\mathrm{d}x^2]$$

- Deviations from General Relativity
- Anisotropic stress

DES Y6: Constraints on Dark Matter properties and Dark Energy


10^3
10^0
10^{-3}
10^{-6}
10^{-9}
10^{-12}
10^{-15}
$P(k)$ $[Mpc/h]^3$
10^{-4}
10^{-2}
10^0
10^2
k $[\mathrm{Mpc/h}]^{-1}$
CDM
$w_{GDM} = +10^{-2}$
$w_{GDM} = -10^{-2}$
$c_s^2 = 10^{-4}$
$c_v^2 = 10^{-4}$

SUMMARY

- Analytical covariances of $P_\ell(k)$ with DESI DR1-like realism. 🤯
  - Methodology paper in prep. 👀
  - Code available at **cosmodesi/thecov** 🆒 🆕 💯
- DES legacy results on physics beyond ΛCDM upcoming 😍
  - With an extended analysis of the physics of the dark sector 😮

Slides at: **otavioalves.com**