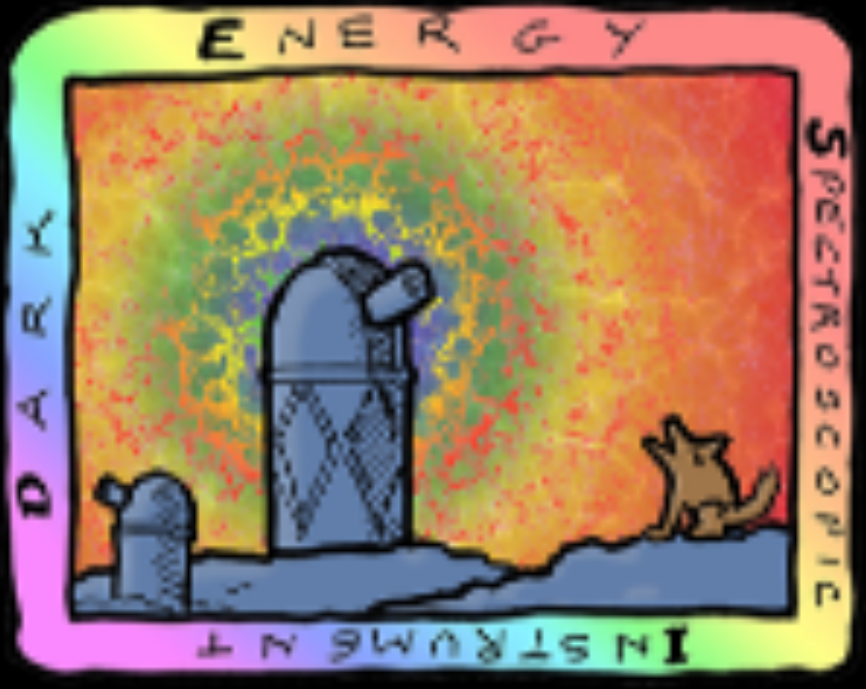

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DESI VI. Cosmological constraints - Aug 2024 XII ICNFP @ Crete, Greece, 2024

Uendert Andrade (UMichigan)

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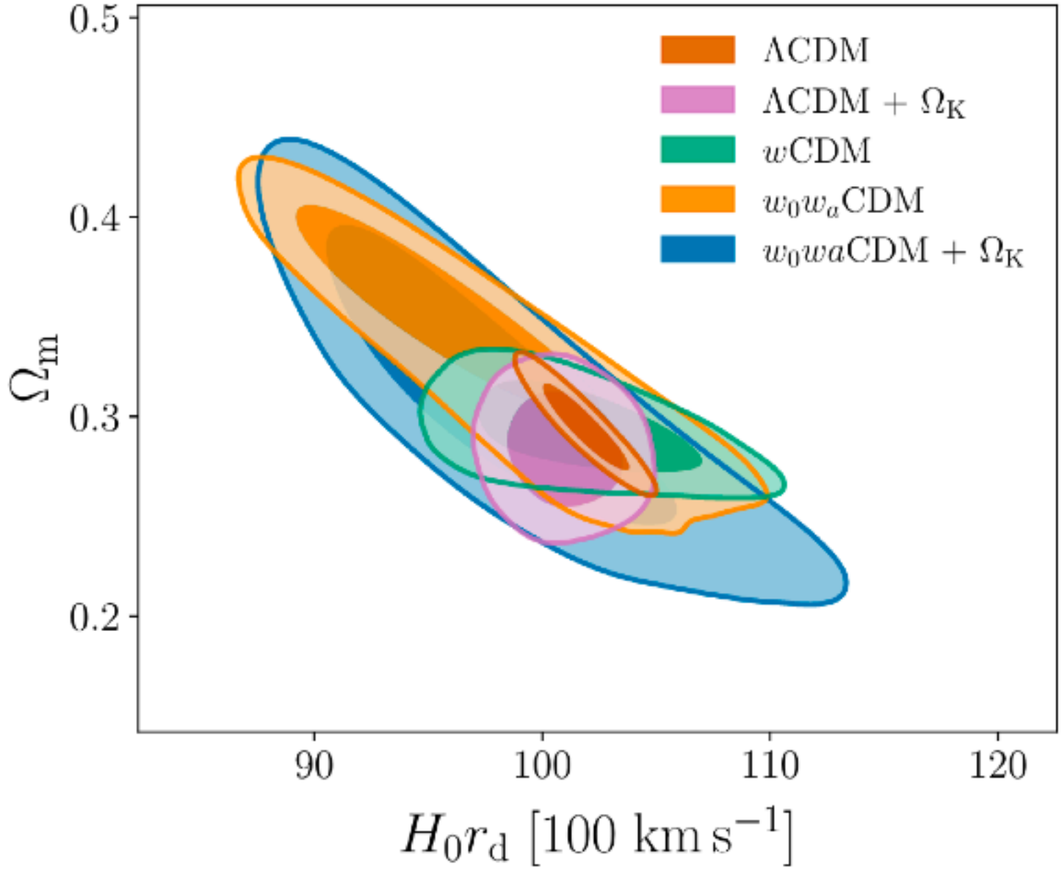
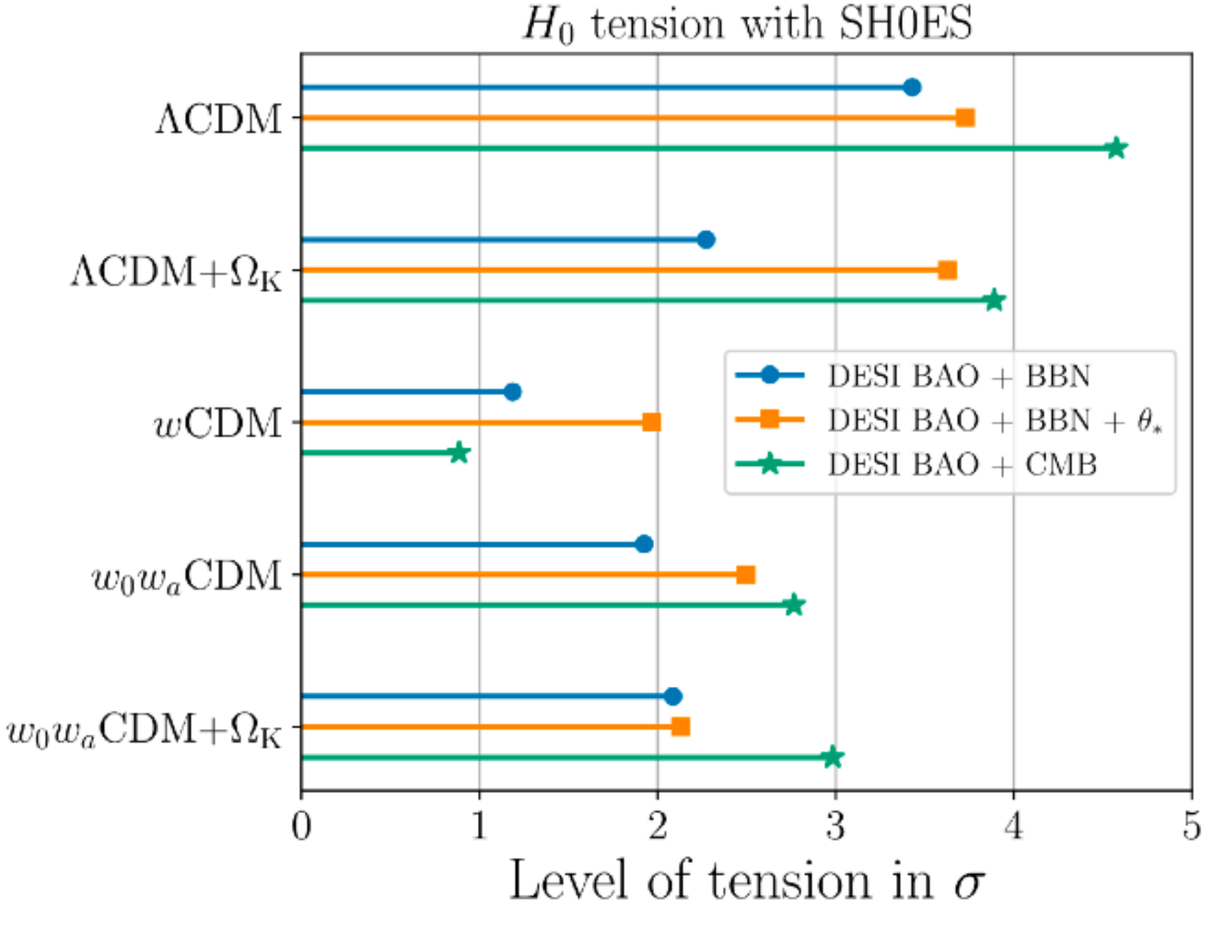

0.5
0.4
0.3
0.2
$\Omega_{\rm m}$
90
100
110
120
$H_0 r_{\rm d}$ [100 km s^{-1}]
ΛCDM
ΛCDM + $\Omega_{\rm K}$
wCDM
w_0w_aCDM
w_0waCDM + $\Omega_{\rm K}$


H_0 tension with SH0ES
ΛCDM
ΛCDM+$\Omega_{\rm K}$
wCDM
w_0w_aCDM
w_0w_aCDM+$\Omega_{\rm K}$
DESI BAO + BBN
DESI BAO + BBN + θ_*
DESI BAO + CMB
0
1
2
3
4
5
Level of tension in σ

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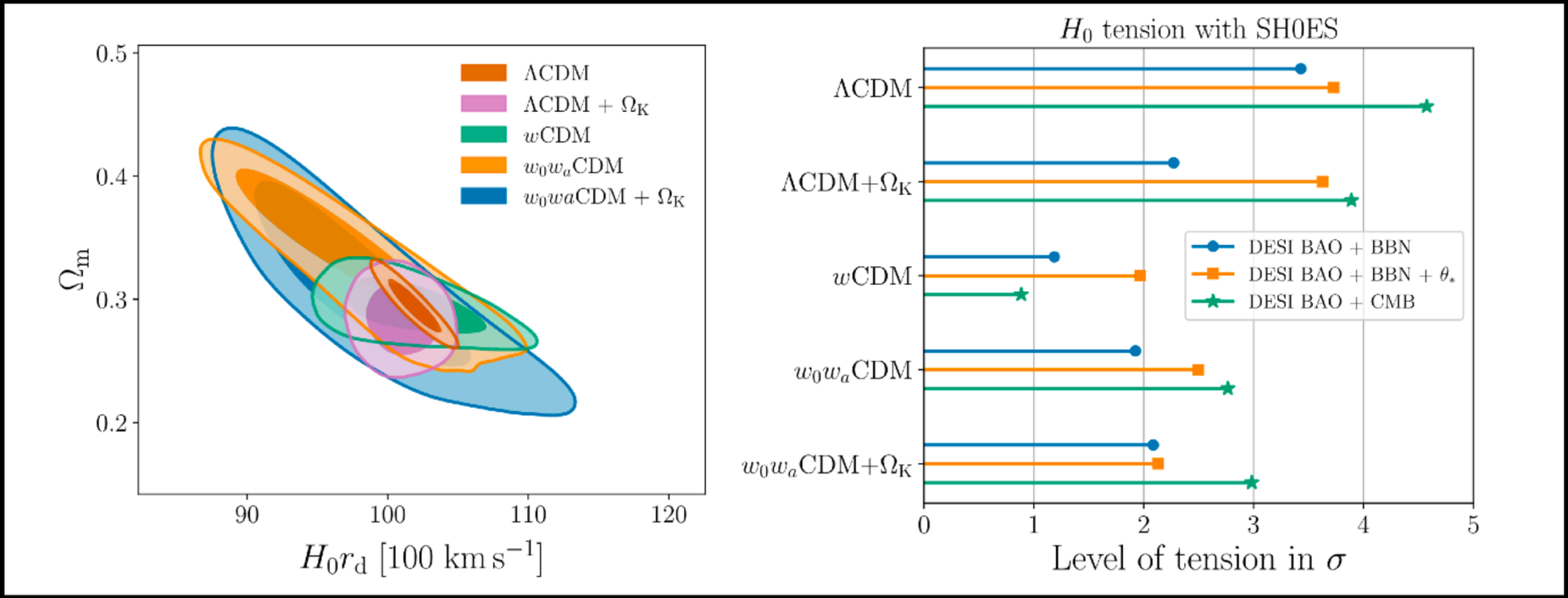
Hubble tension?

- Extension models: modify the background geometry or late-time expansion history
- The calibration of the sound horizon using BBN relies on assumptions about the physics at the time of BBN: effective number of relativistic degrees of freedom, N_{eff}



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Summary

- DESI + BBN (+ θ_*) constrains H_0 to $\sim 1\,\%$; 3.7σ tension w/ SH0ES
- DESI, in combination with CMB data, favors zero spatial curvature
- DESI is consistent with $w = -1$ when w assumed constant
- When w allowed to vary with time:
  - DESI combined with CMB: 2.6σ tension with $(w_0, w_a) = (-1,\ 0)$
  - Adding SN leads to $2.5, 3.5, 3.9\sigma$ **tension** with $(w_0, w_a) = (-1,\ 0)$.
    (Discrepancy depends on the SN sample used)
  - Limit on $\sum m_\nu$ improves to < 0.072 eV$(95\,\%\,, \Lambda\text{CDM})$; < 0.195 eV$(95\,\%\,, w_0 w_a\text{CDM})$