

Updates on HSC weak lensing (B02 update)

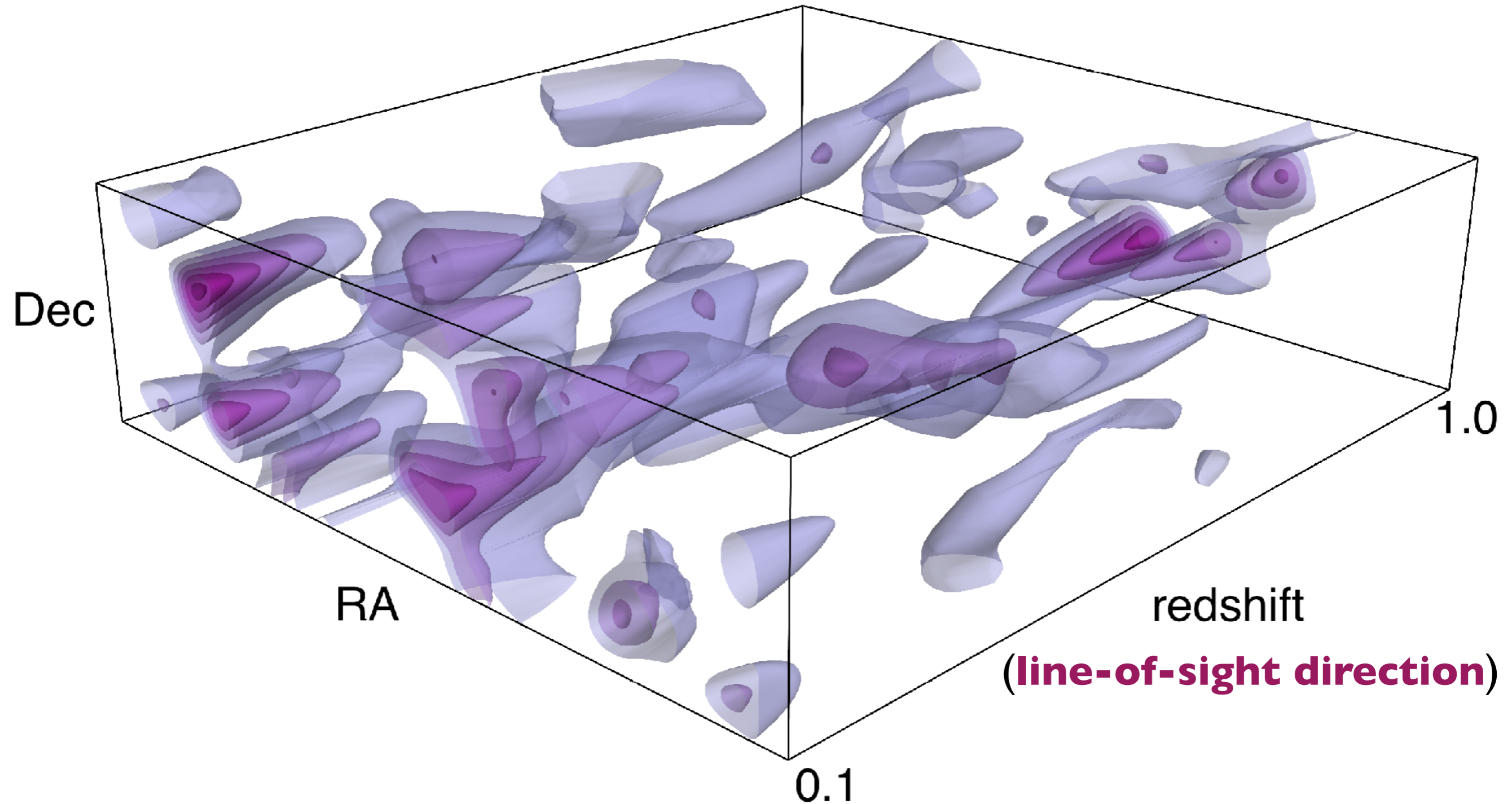
Masamune Oguri
(University of Tokyo)

B02 研究分担者

Conclusion

- in this fiscal year we published **the first HSC weak lensing cosmology paper** (finally...)
- this result is based on the first year data covering **~140 deg²**, about **1/7** of the total
- other exciting projects are ongoing

Largest 3D mass map ever created



Quantifying mass distribution

- we use **angular power spectrum C_ℓ**

$$C_\ell = \frac{1}{2\ell + 1} \sum_{m=-\ell}^{\ell} |a_{\ell m}|^2$$

**angular
power
spectrum**

$$\kappa(\boldsymbol{\theta}) = \sum_{\ell} \sum_{m=-\ell}^{\ell} a_{\ell m} Y_{\ell m}(\boldsymbol{\theta})$$

**matter
distribution**

**spherical
harmonics**

- we use pseudo C_ℓ method to measure angular power spectrum for a partial sky

(e.g., Hikage+2011; Hikage & MO 2016)

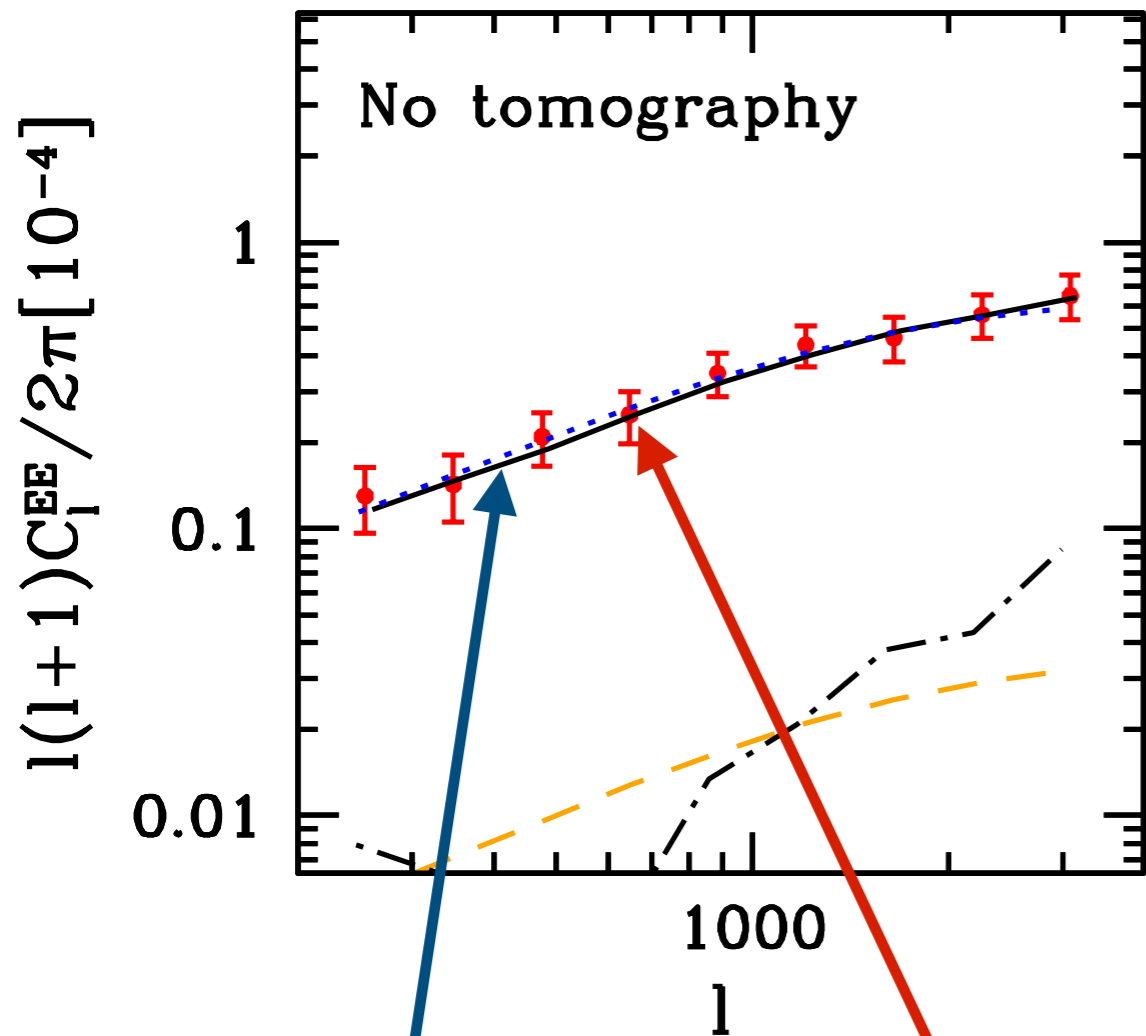


submitted in 2018 September
accepted in 2019 January

Cosmology from cosmic shear power spectra with Subaru Hyper Suprime-Cam first-year data

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Angular power spectrum



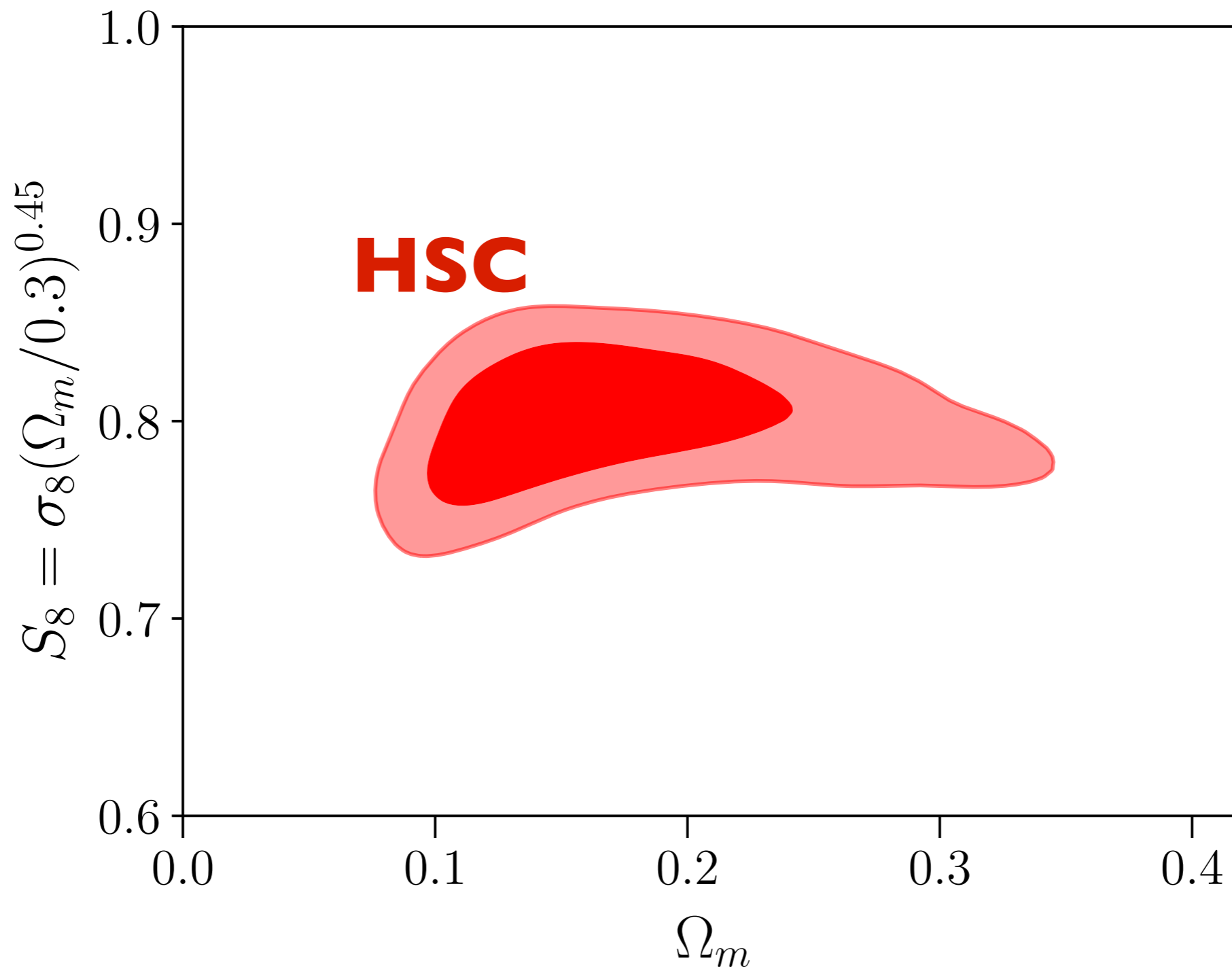
**best-fit
model**

**measured
from HSC data**

- one of **the most accurate** measurements of weak lensing angular power spectrum to date

Measured density fluctuations

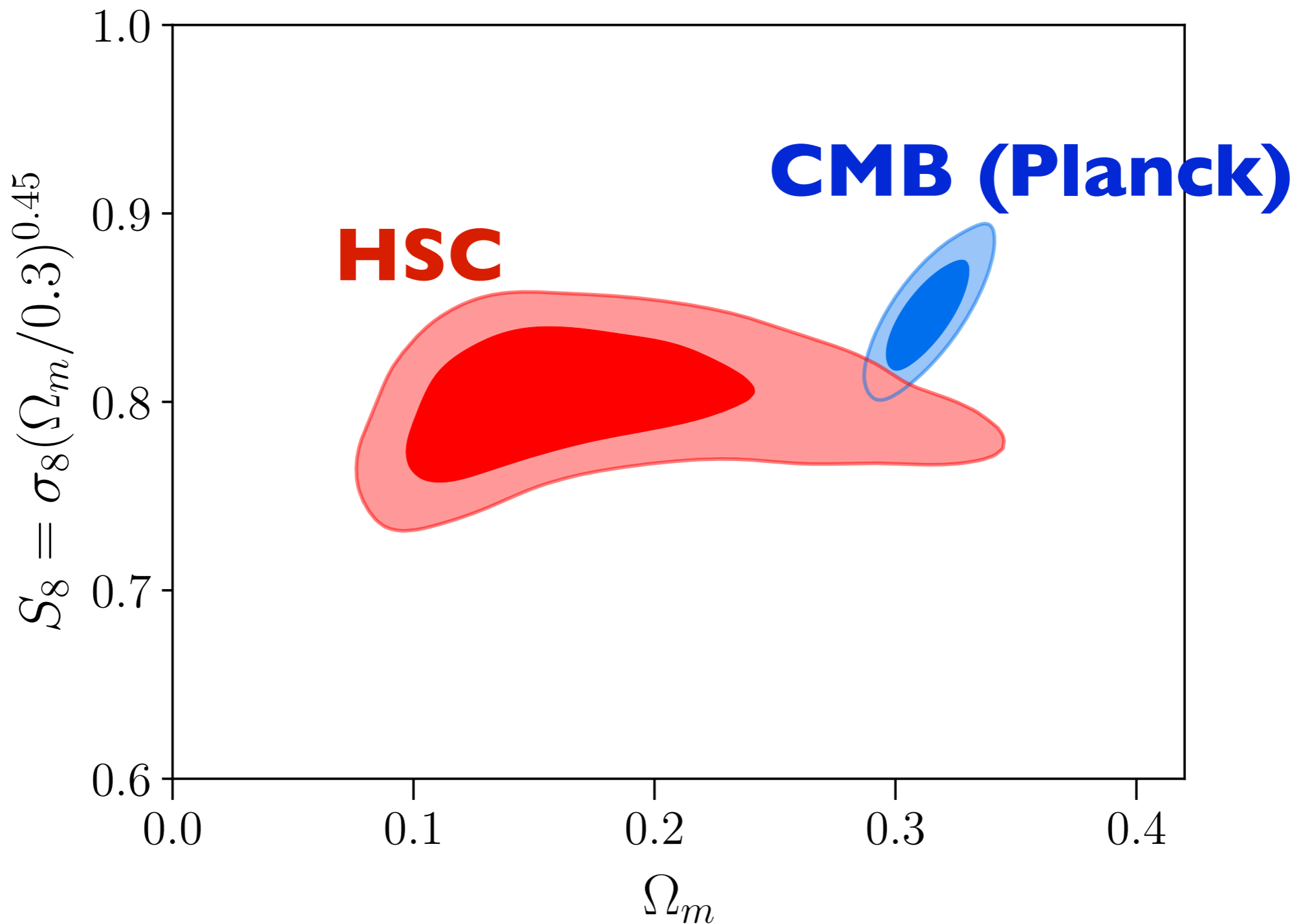
**density fluctuations
at present Universe**



total matter density (amount of dark matter)

Measured density fluctuations

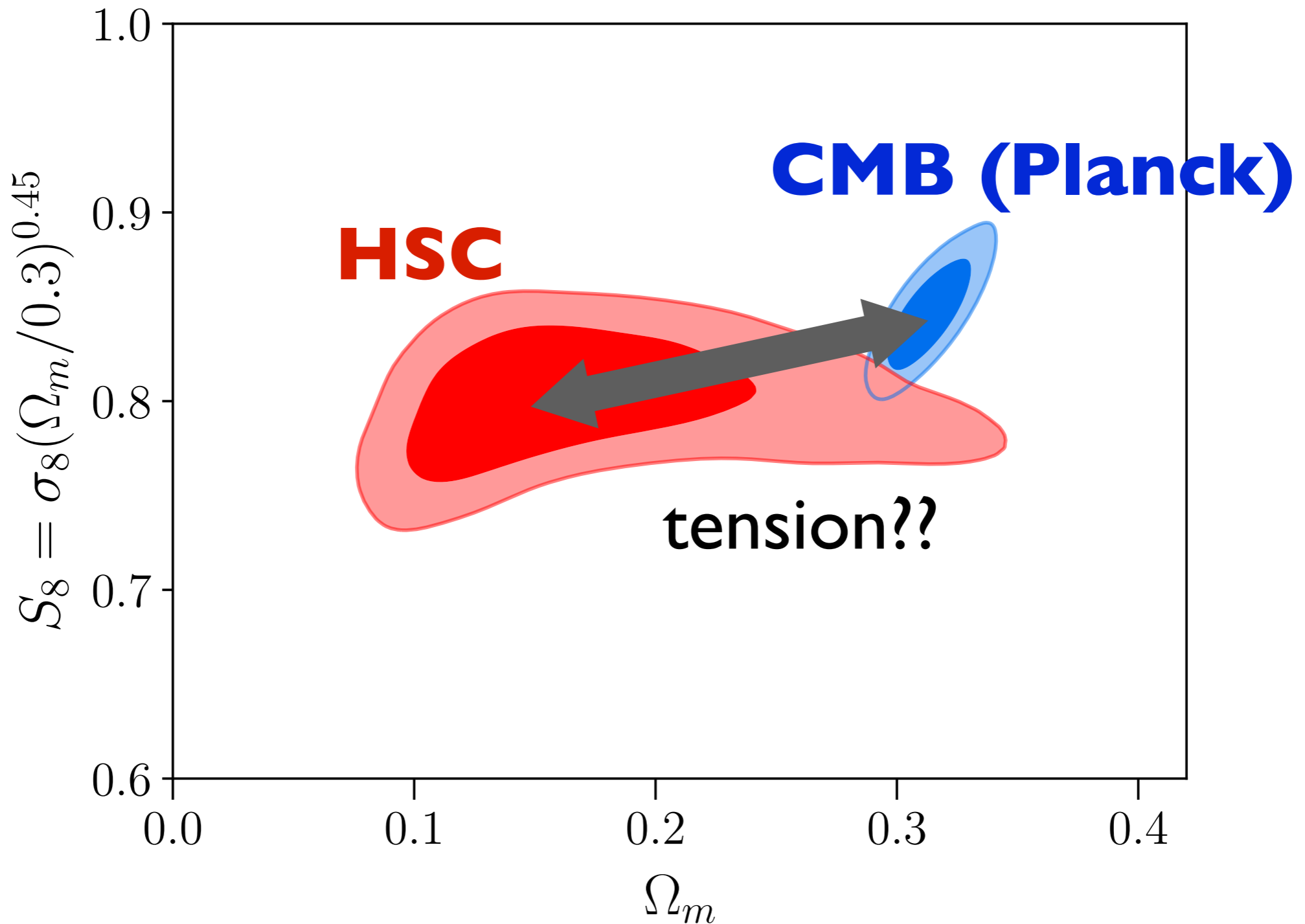
**density fluctuations
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total matter density (amount of dark matter)

Measured density fluctuations

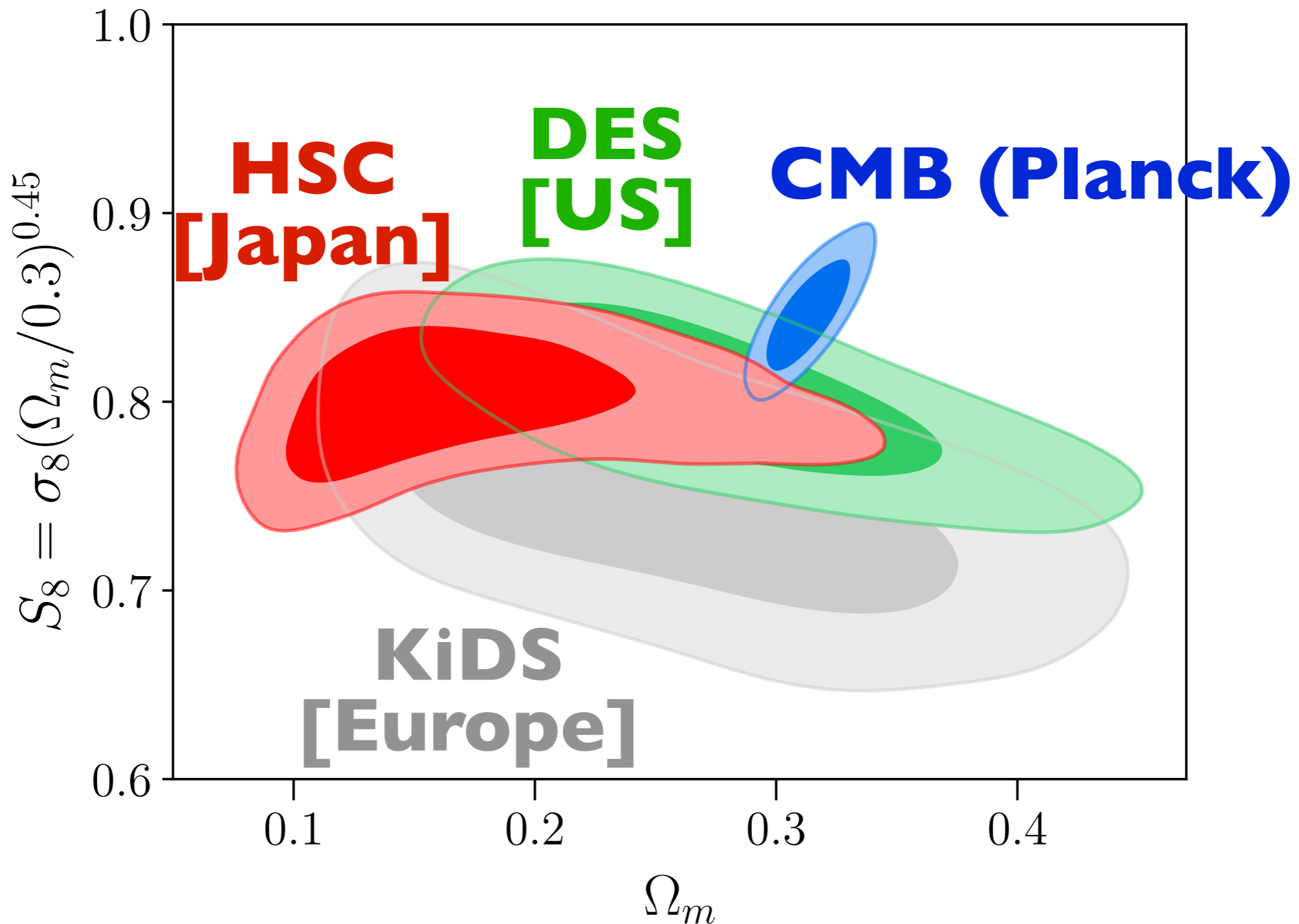
**density fluctuations
at present Universe**



total matter density (amount of dark matter)

Comparison with other results

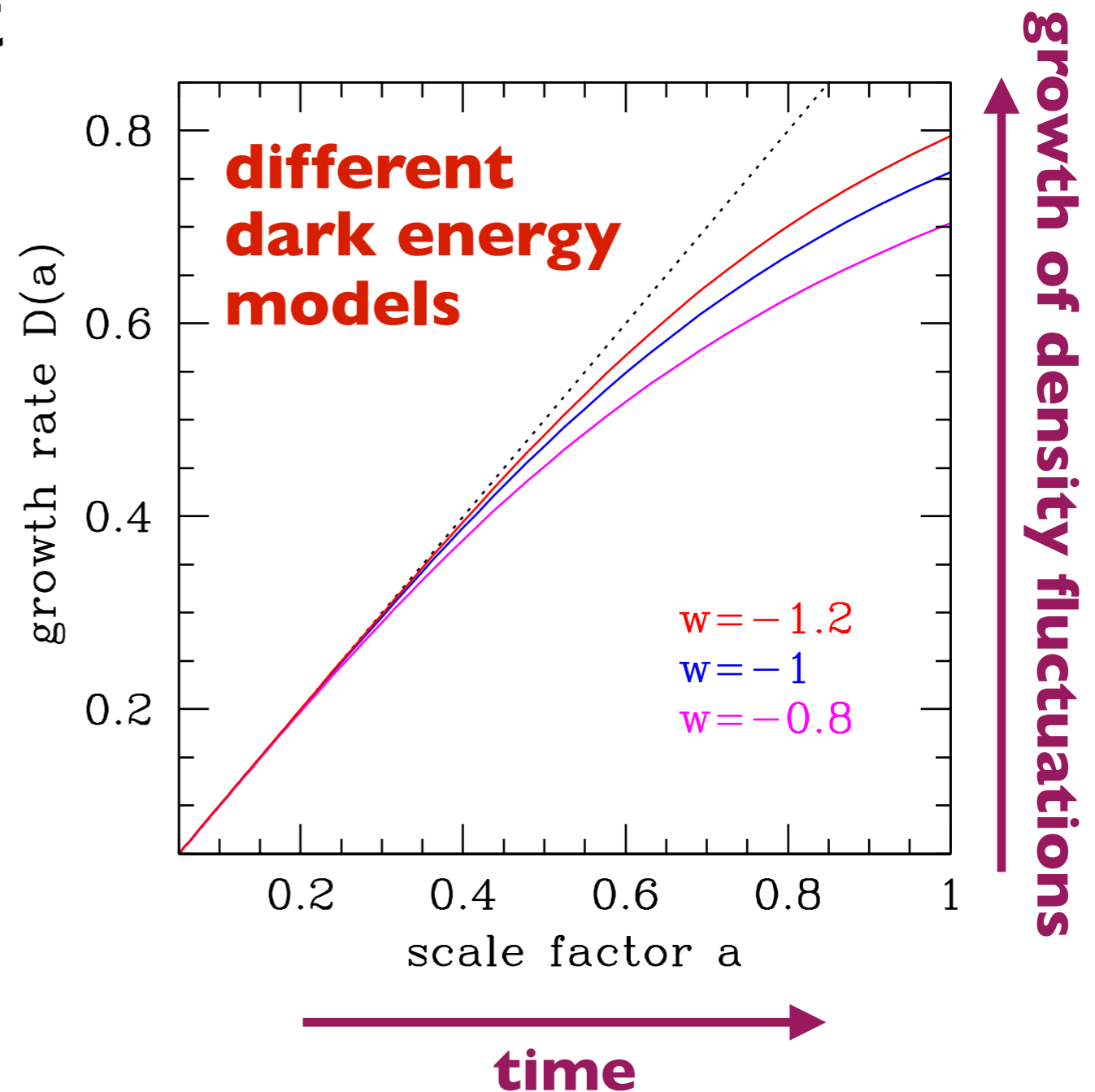
**density fluctuations
at present Universe**



total matter density (amount of dark matter)

What does the tension mean?

- “tension” may suggest a lot of interesting possibilities
 - **non-standard dark energy**
 - **modification of general relativity**
 - **massive neutrinos**
 - ... and more?



Other ongoing projects

- real-space cosmic shear analysis (Hamana+)
- cosmology with galaxy-galaxy lensing
(Miyake+)
- cross-correlation with CMB data (several people)

HSC-Polarbear cross correlation

- **first measurement** of cross-correlation btw CMB polarization lensing (**B01**) and optical weak lensing (**B02**)
- paper will be submitted in ~2 weeks!



T. Namikawa



Y. Chinone



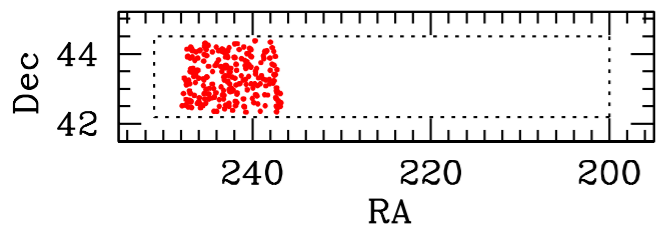
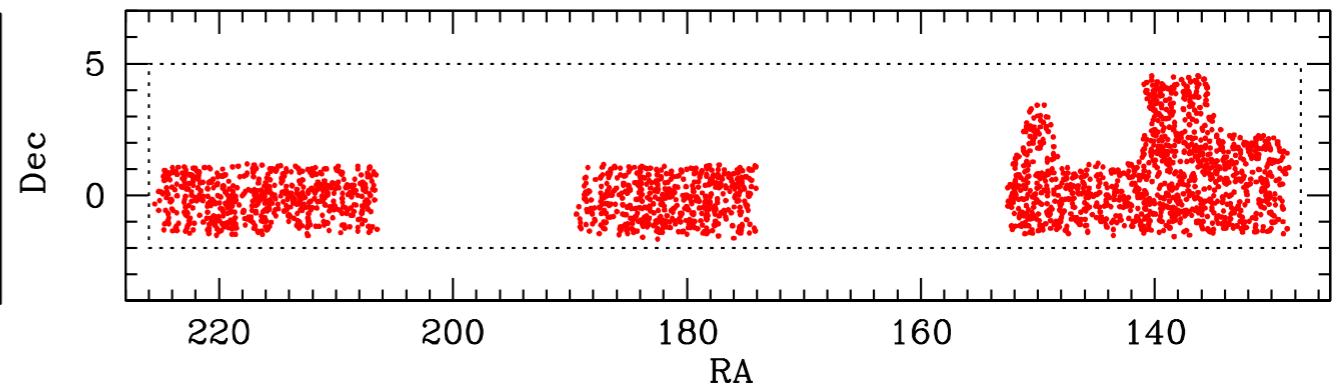
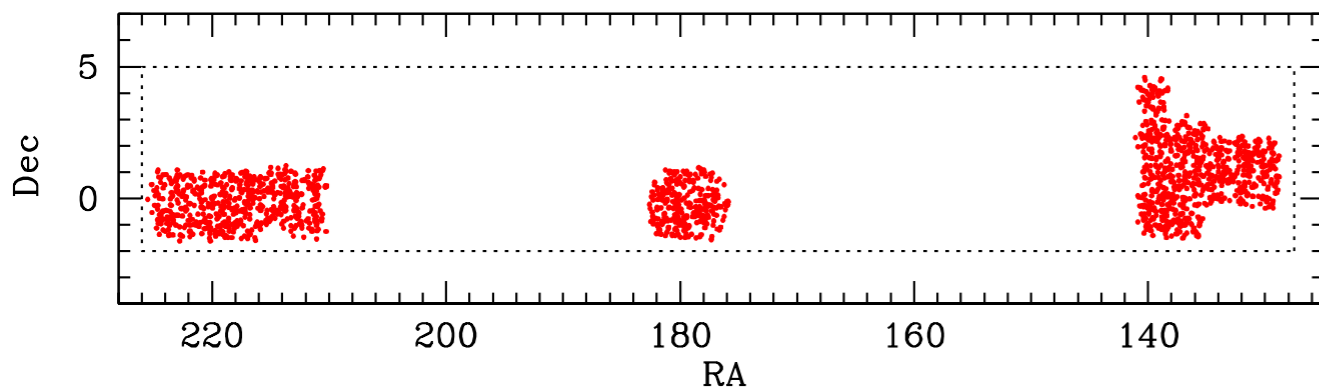
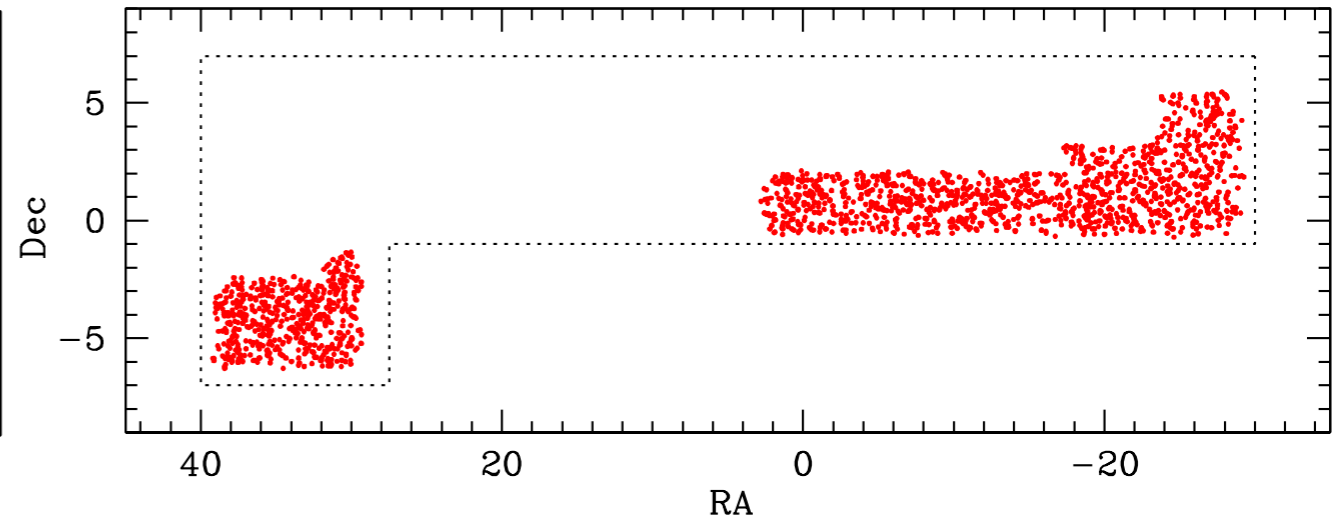
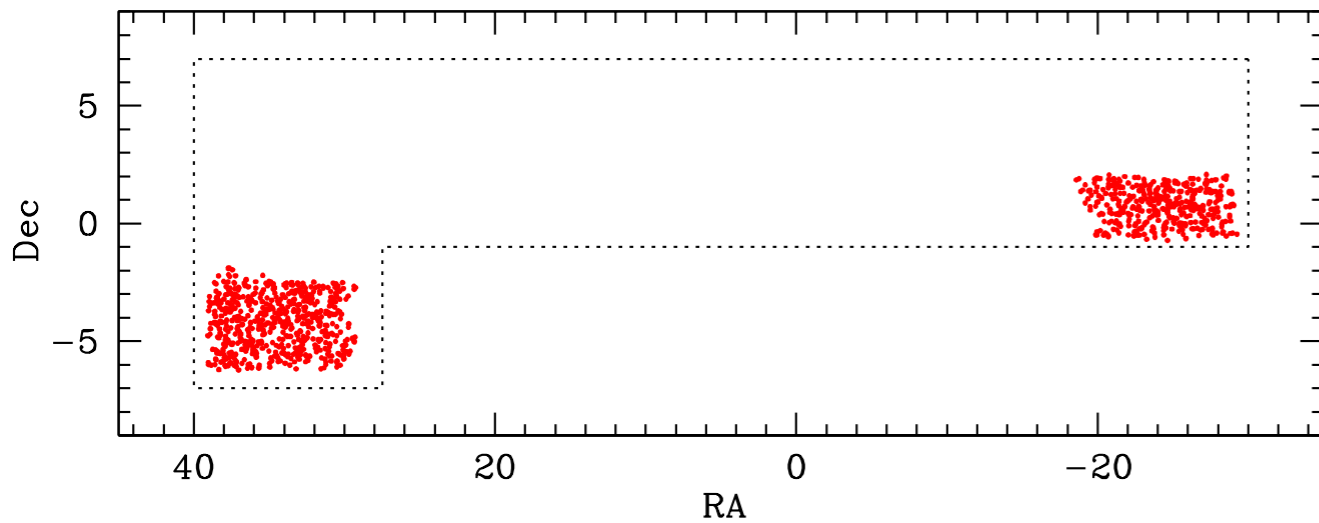
H. Miyatake

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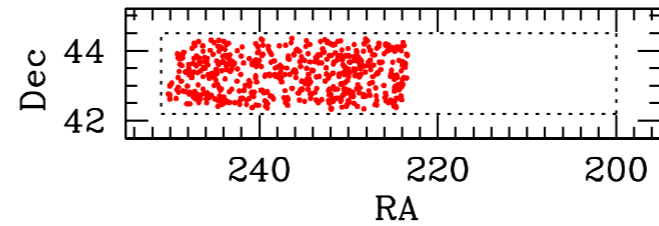
...

More data?

- the **3rd year HSC weak lensing shear catalog** is being constructed...



S16A



S18A

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