Constraining Dark Energy and Gravity with large-scale structures

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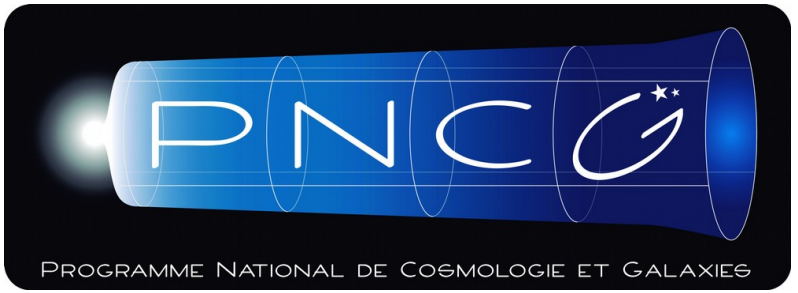
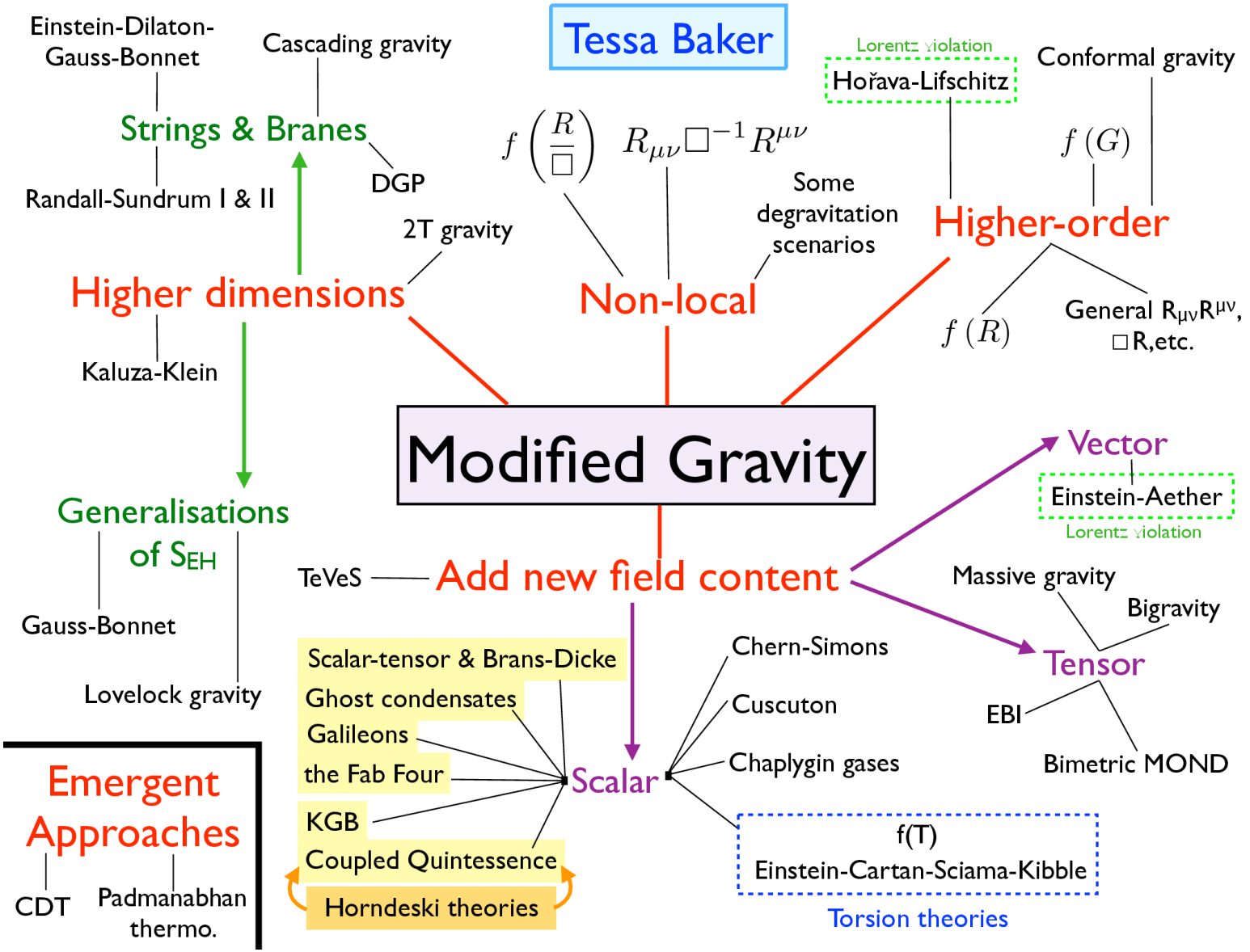


Constraining Dark Energy & Modified Gravity



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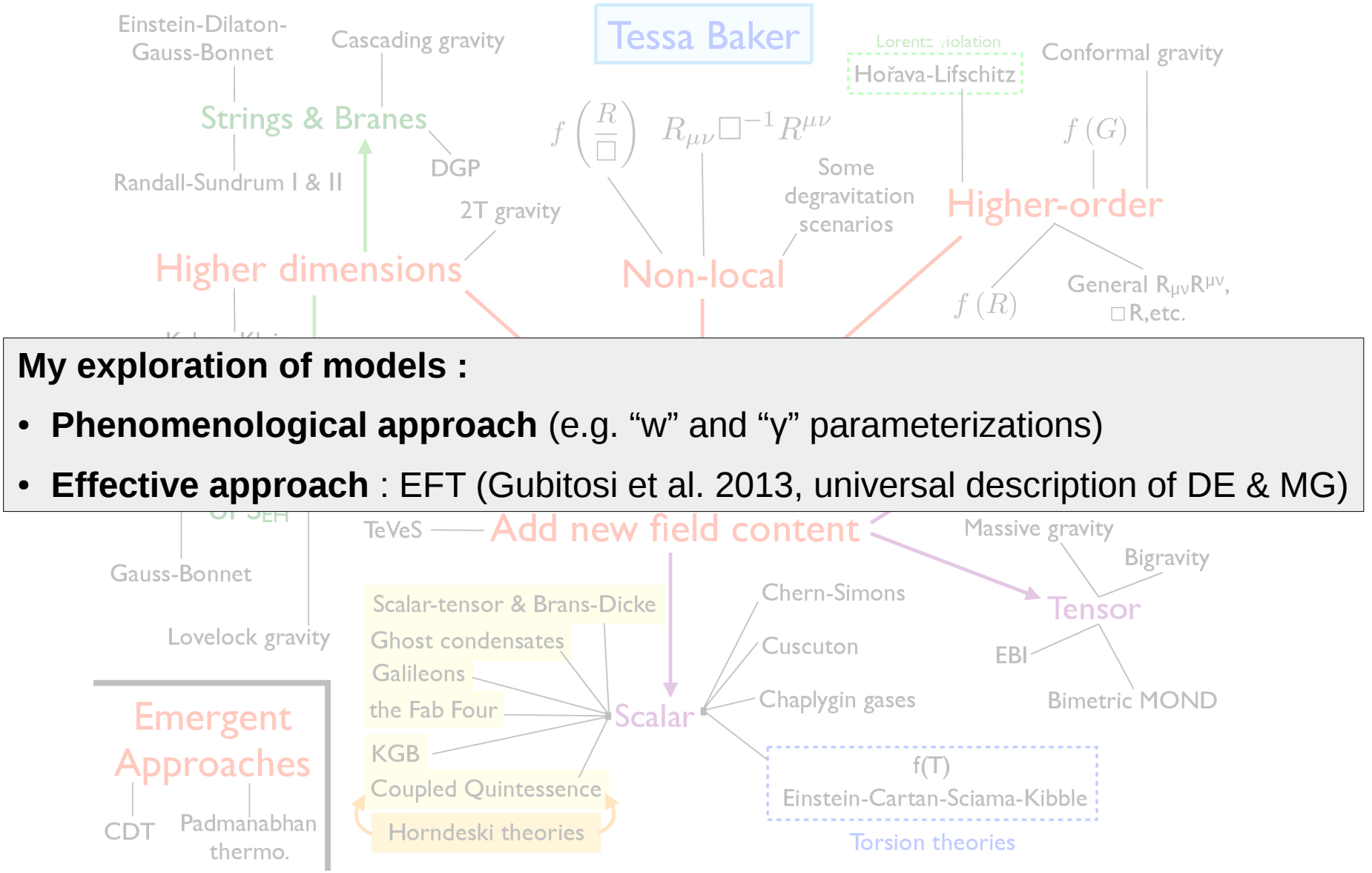


My exploration of models :

- **Phenomenological approach** (e.g. “w” and “γ” parameterizations)
- **Effective approach** : EFT (Gubitosi et al. 2013, universal description of DE & MG)

Constraining Dark Energy & Modified Gravity

DE/MG affects the Universe in two ways :

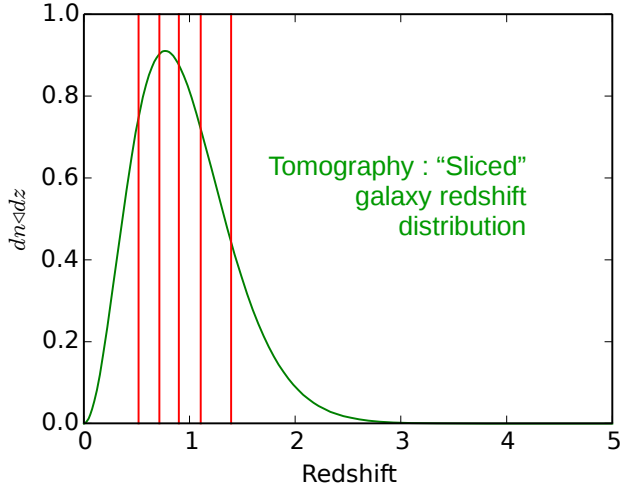
- Background evolution (i.e. H(z)) => very well constrained by Planck + BAO + SN
- **Growth of structures** => future large scale galaxy surveys (LSST, **Euclid**)

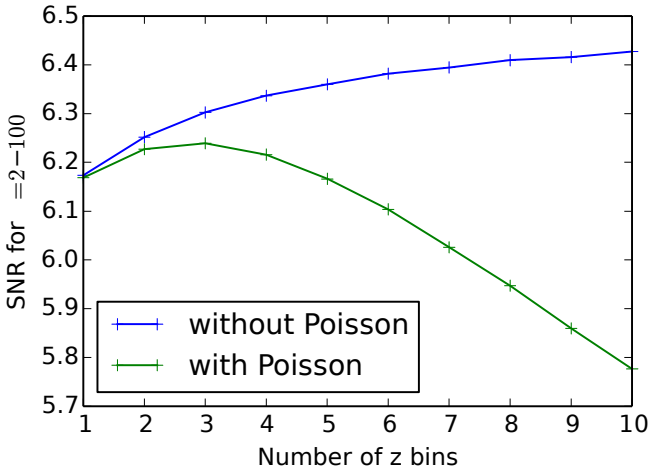
DE/MG with Euclid :

- Galaxy clustering & Weak lensing
- **Combination/cross-correlation with CMB : ISW effect**
- **Individual structures : (super-)clusters, (super-)voids**

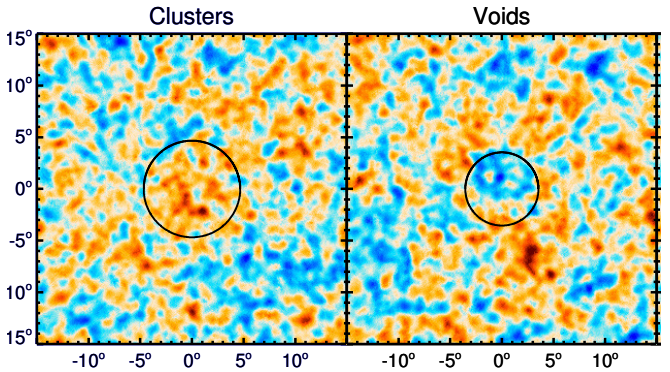
The integrated Sachs-Wolfe effect

- Impact of evolving Φ on CMB photons, caused by DE/MG
- Theoretical predictions for models + constraints forecasts + optimization for surveys





- Stacking in CMB at **superstructures** positions



- In **Euclid** : combination & correlations with other probes (IST, CMB-X working group)

The integrated Sachs-Wolfe effect

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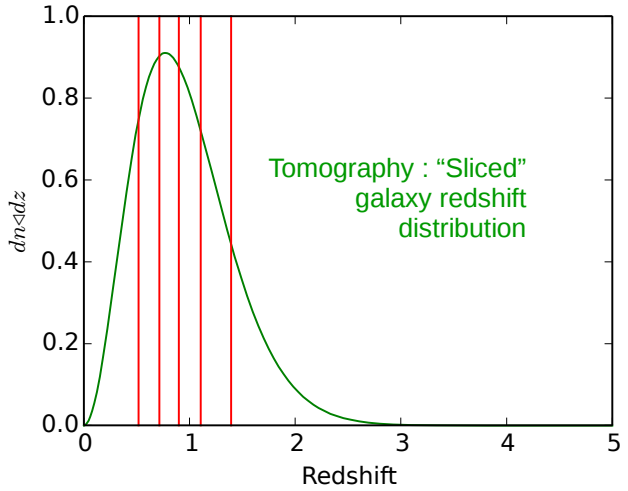

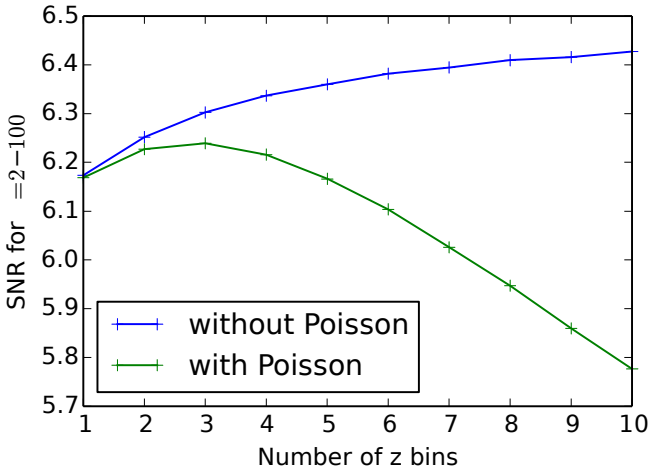

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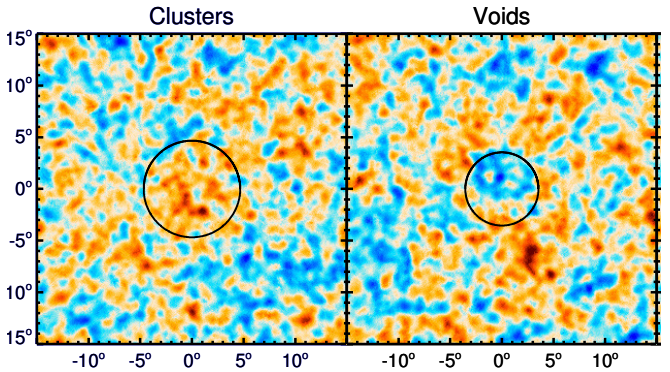

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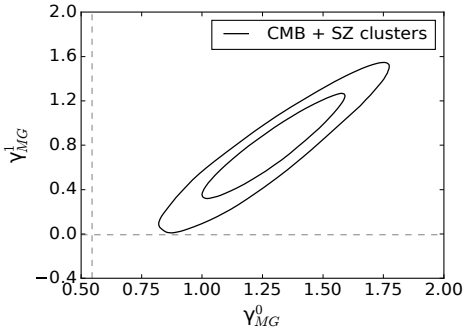
Clusters of galaxies

- Abundance very sensitive to cosmology
- Planck SZ clusters in tension with LCDM
- Derive constraints on DE/MG



(Ilic et al. in prep)