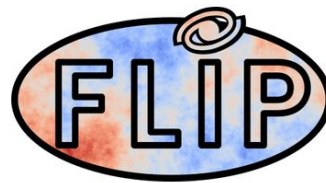# fs8 Fisher Forecast for ZTF DR4

Fisher Forecast

FLIP (Field Level)

- Use the covariance of the maximum likelihood method
  - survey mask taken into account
  - the error on each velocity is propagate correctly for each object

Fisher forecast is the derivative of the covariance matrix with respect to fs8

$$C_{ij}^{vv} = \frac{H_0^2}{2\pi^2} \frac{(f\sigma_8)^2}{(f\sigma_8)_{\text{fid}}^2} \int_0^{+\infty} f_{\text{fid}}^2 P_{\theta\theta}(k) D_u^2(k) W_{ij}(k; \mathbf{r}_i, \mathbf{r}_j) \mathrm{d}k$$

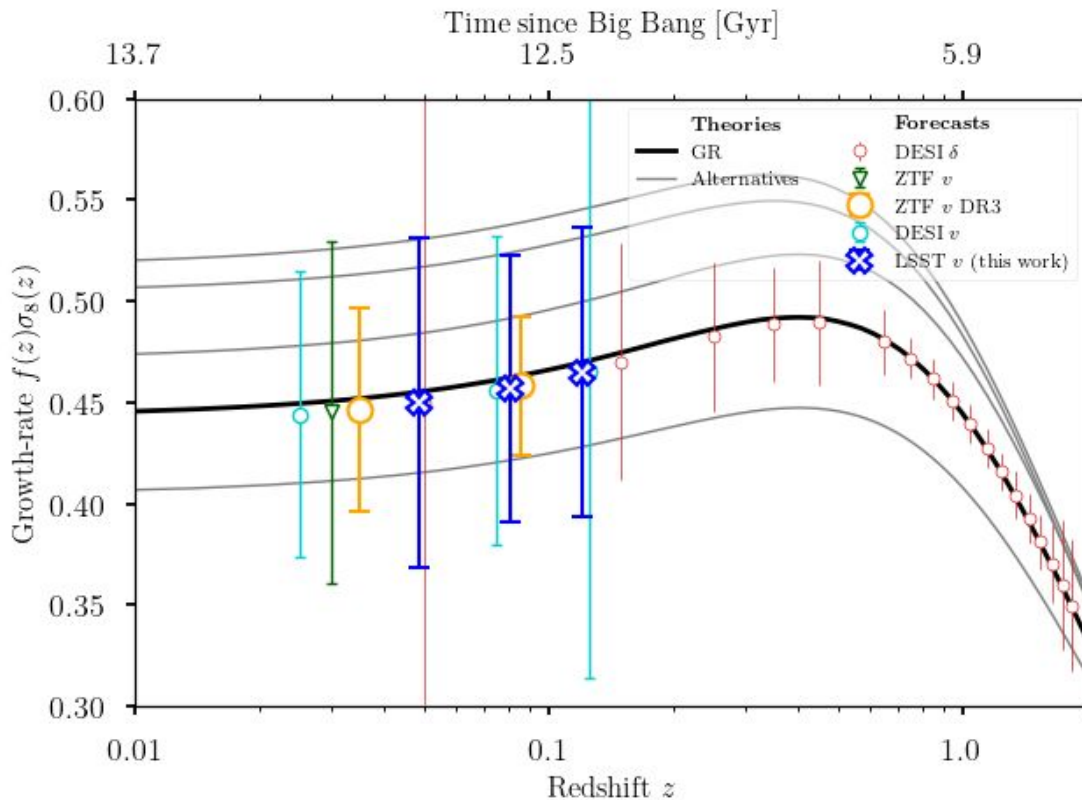work in progress to have a model to constrain :
- Omega_m - gamma
- sigma_8 - gamma

DR4 (6 y ZTF) fisher forecast
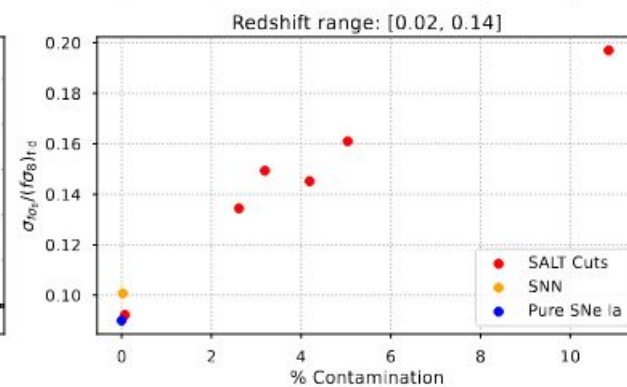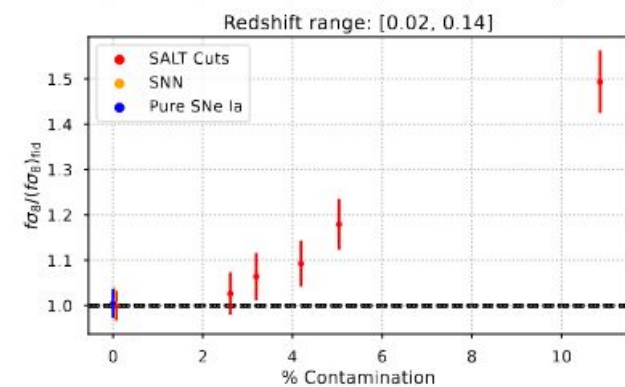
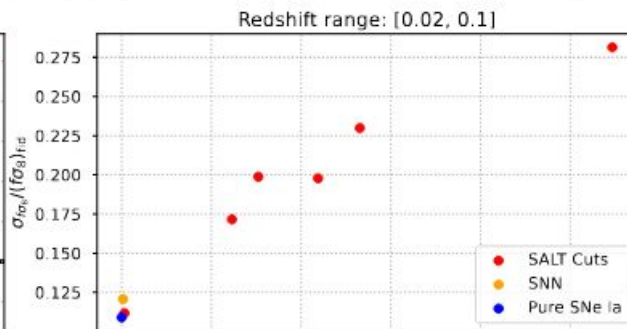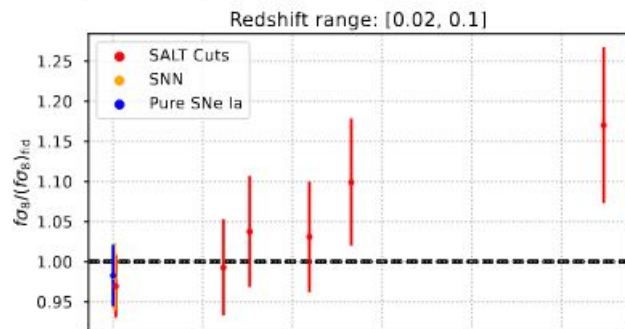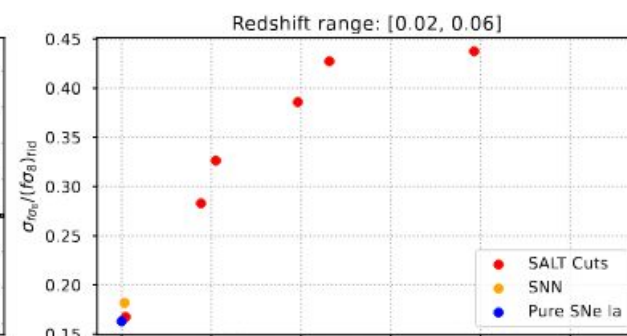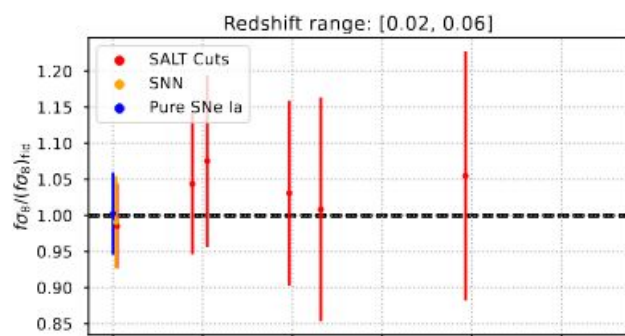using Bastien ZTF 6 years simulation:
No selections: just 5 observations in any filter + 1 point around maximum
so **Optimistic**
statistical error

0.02<z<0.1
about
18k SNe Ia

Result of FLIP Fisher
Velocity only for DR4

Redshift range: [0.02, 0.06]
Redshift range: [0.02, 0.06]
Redshift range: [0.02, 0.1]
Redshift range: [0.02, 0.1]
Redshift range: [0.02, 0.14]
Redshift range: [0.02, 0.14]

This is for LSST.
full simulation of 10yr survey and realistic selections.

Different sample:
- pure SNe Ia
- SNN (classification using supernnovae)
- SaLT cuts (classification using cuts on the SALT fit results

- At which point we know the object in DR4? Selection function?
  if we have good understanding we can do full study from LCs cto
  cosmology and test systematic in fs8 due to classification and
  selections. (Or we can just run fisher forecasts)

- We can improve the fitting method by including the probability
  from the classifiers (Beams-like)

- Having so many tracers in this small volume means non linear
  part in the field becomes important? how this impact?
  do we need to have an EFT solution? (lot of theoretical work)

- With this statistic maybe worth to constrain the degenerate
  parameters
  (Omega_m-gamma-sigma_8) not only fs8

DESI BGS

4MOST CRS BG

SNIa
SNIax
SN91bg-like
SNIIP/L
SNIIn
SNIIb
SNIc
SNIb
SNIc-BL

4MOST HS

Redshift