Incontro Referee INFN

Report on Rome Activities

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Team Members

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Research Activities

Likelihood and Forecasts

- development of the official Euclid likelihood code
- definition of the reference scenario for DR1 and DR3

Covariance

- estimate of the analytical covariance for 3x2pt probe
- development of the official Euclid covariance code

High Order Statistics

- going beyond 2nd order statistics in WL
- forecast and modelling of high order statistics

CLOE

Likelihood code

- computiing observables
- including systematics
- comparing with data
- constraining parameters

Theory

- flat and non flat GR DE
- parameterised MG
- Limber approximation
- Gaussian likelihood

Systematics

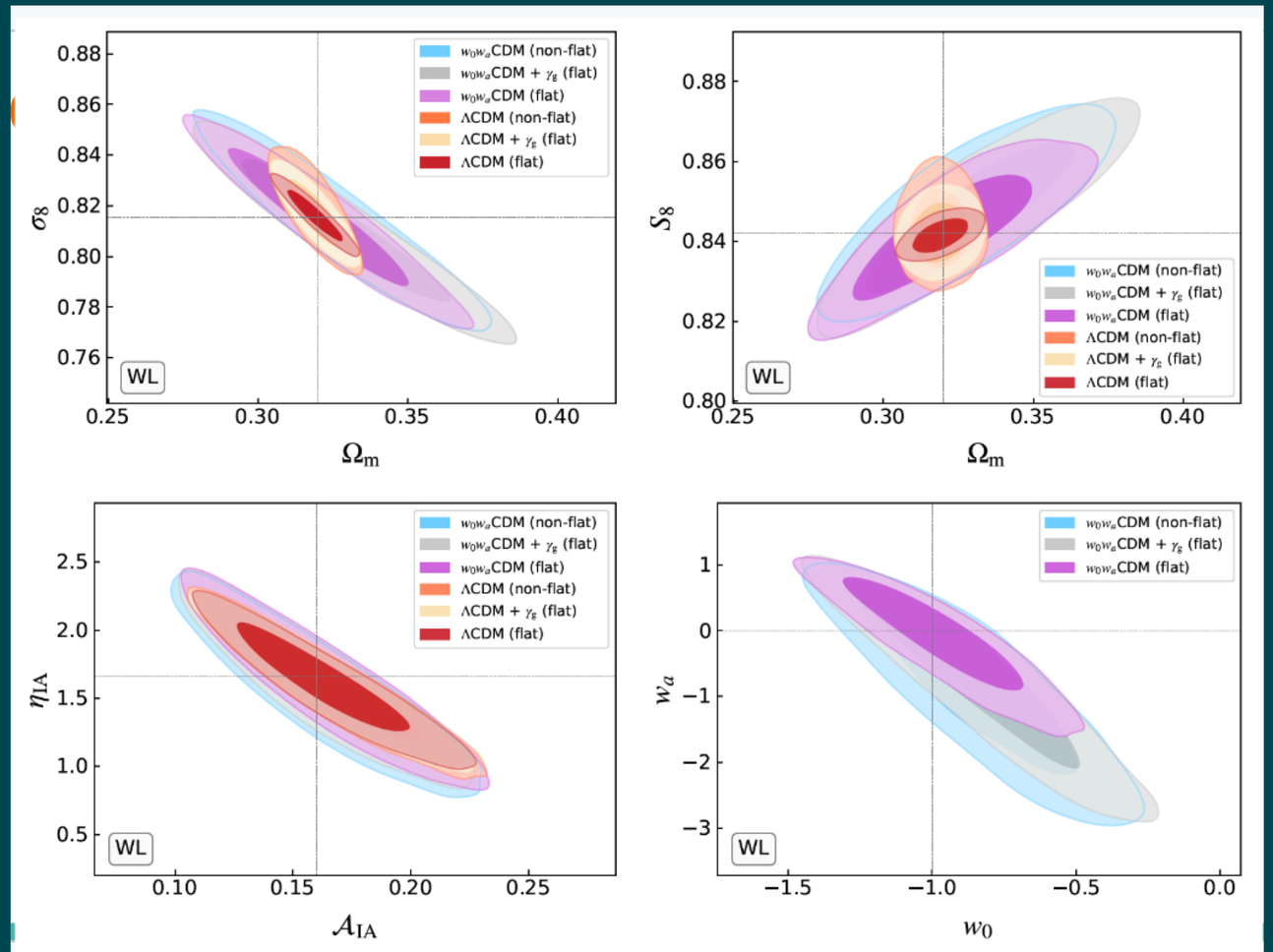
- shear multiplicative bias
- photo-z mean shift
- mag and gal bias
- sample purity

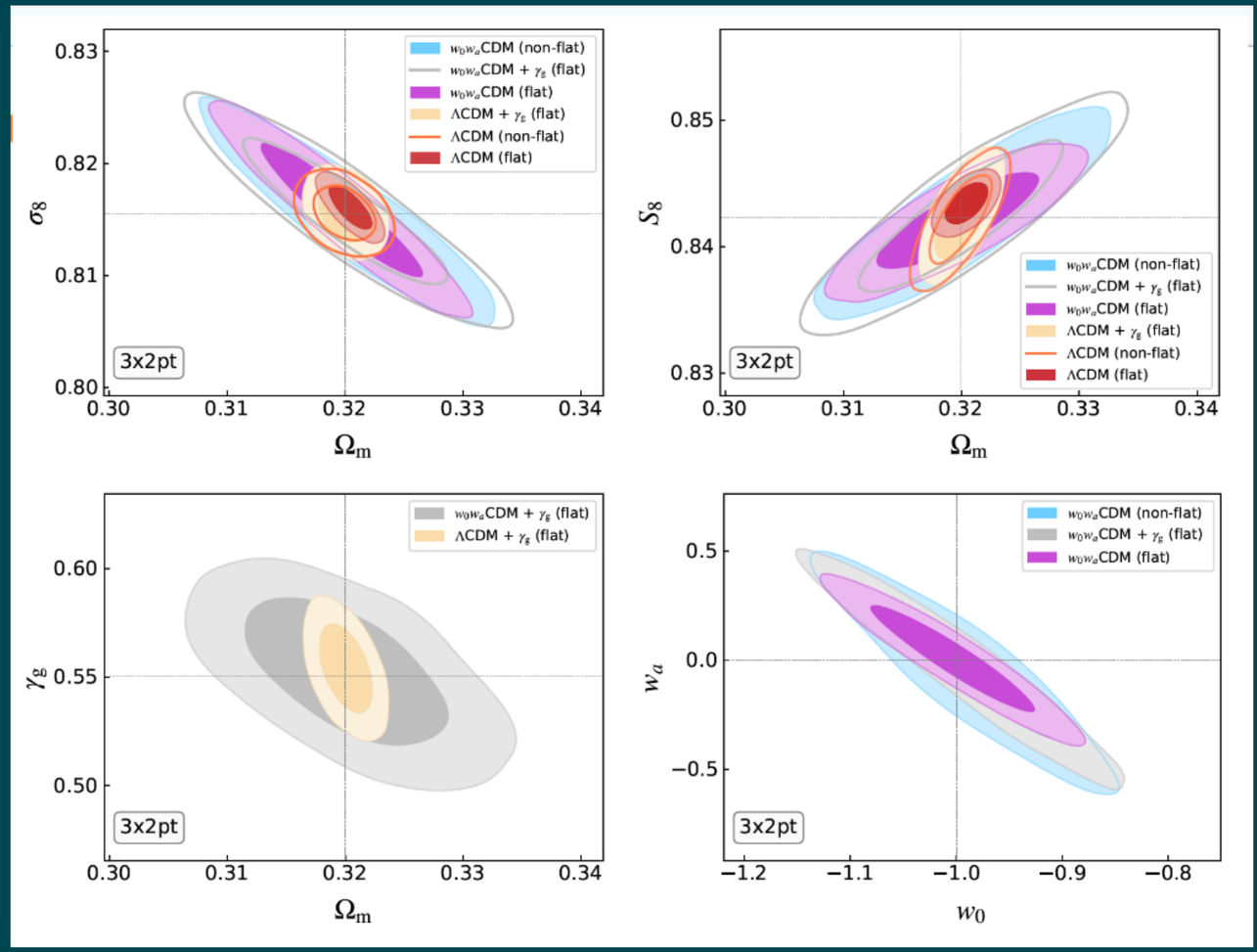
Code releases

- v1.0 (May 2021)
- v1.1 (internal)
- v2.0.2 (June 2023)
- v2.1 (end of IST:L)

Shear and 3x2pt Results

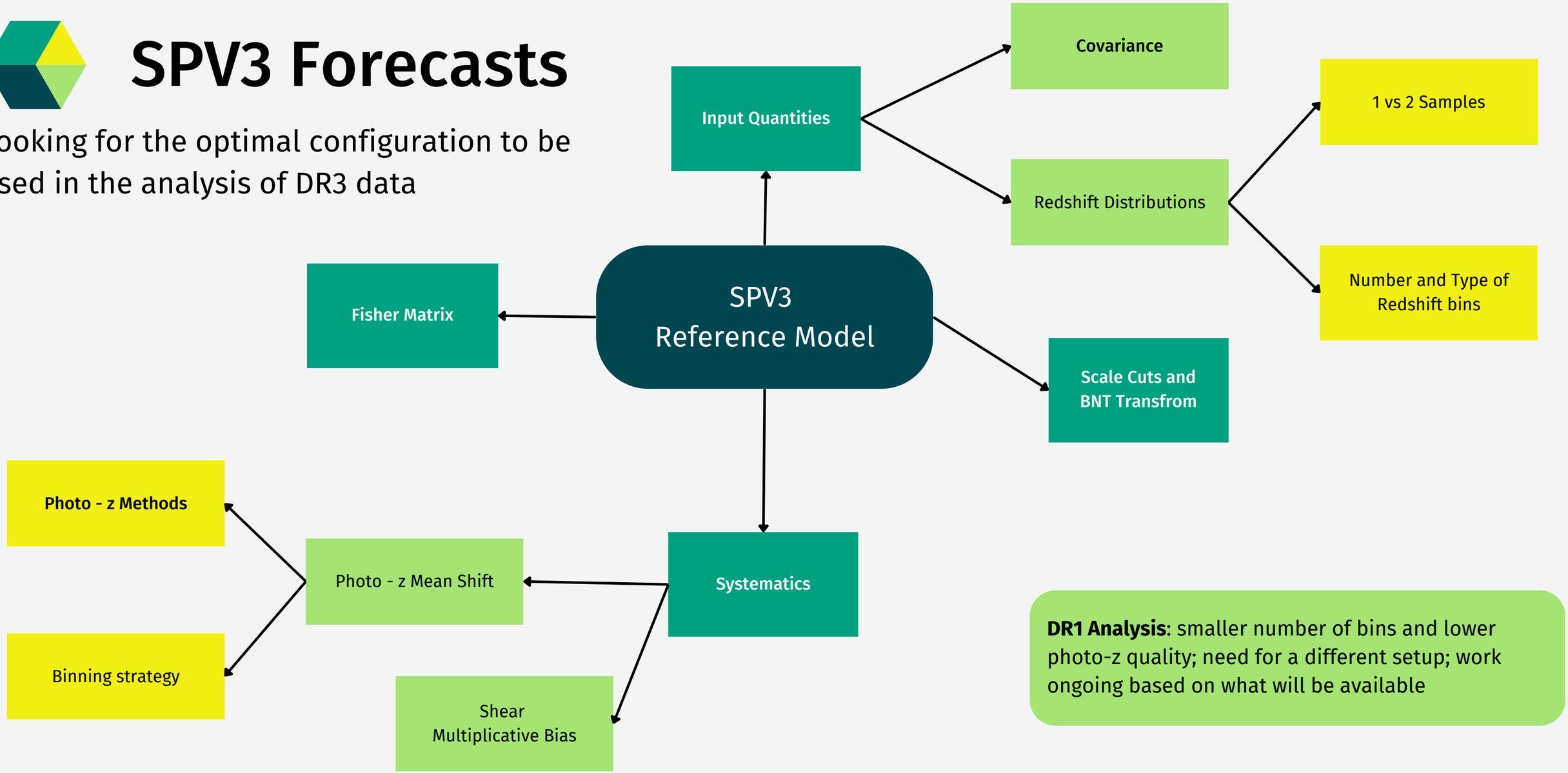
- Euclid - like dataset (no. bins, n(z), multipoles)
- photometric observables only (WL and 3x2pt)
- RedBook priors on systematic nuisance parameters
- Lessons learnt on computational time needed





SPV3 Forecasts

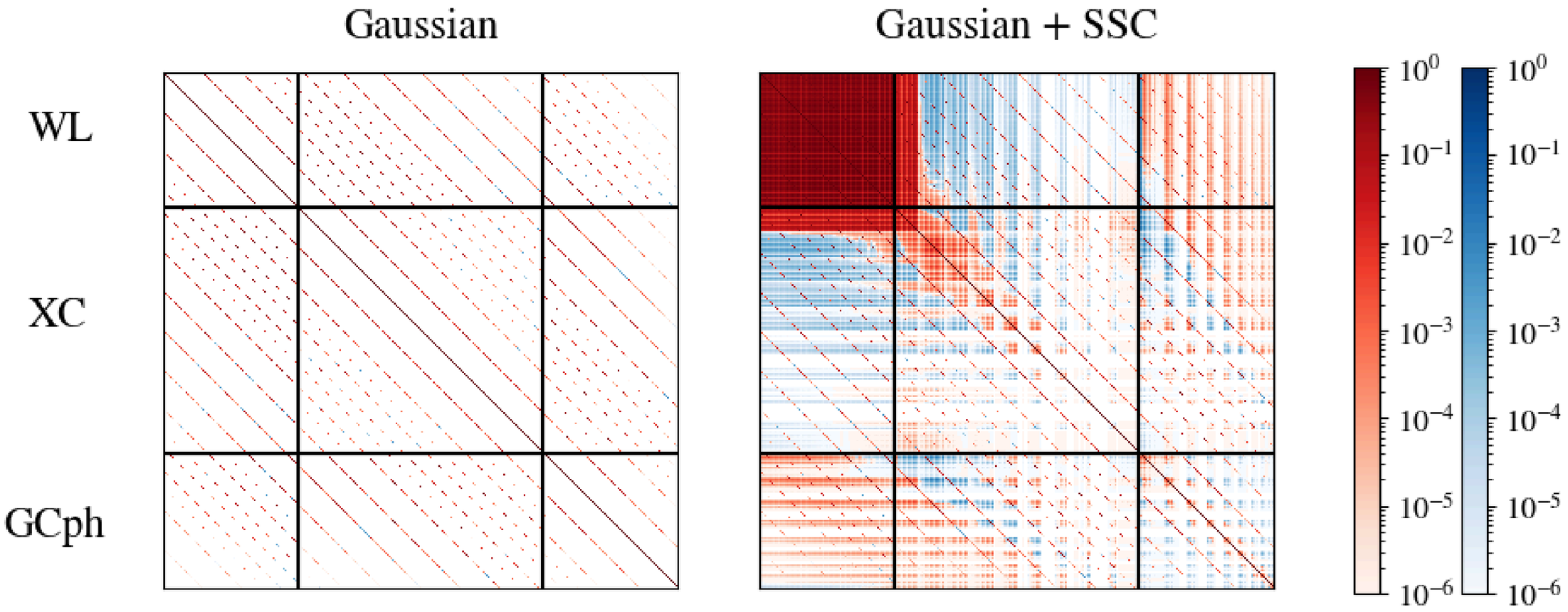
Looking for the optimal configuration to be used in the analysis of DR3 data



DR1 Analysis: smaller number of bins and lower photo-z quality; need for a different setup; work ongoing based on what will be available

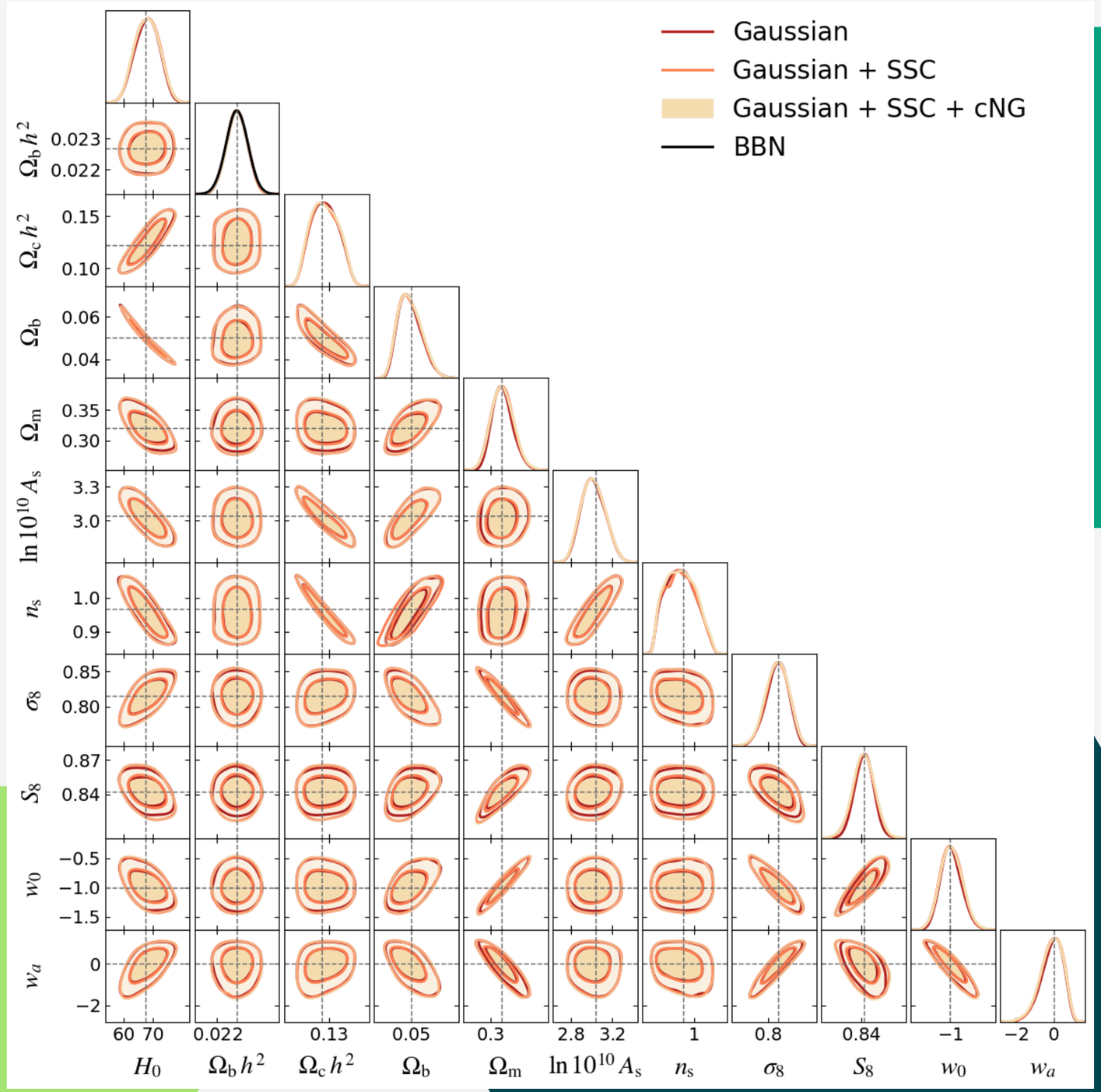
Analytical Covariance for 3x2pt

developing a code computing all relevant contributions (Gaussian + SSC + cNG)



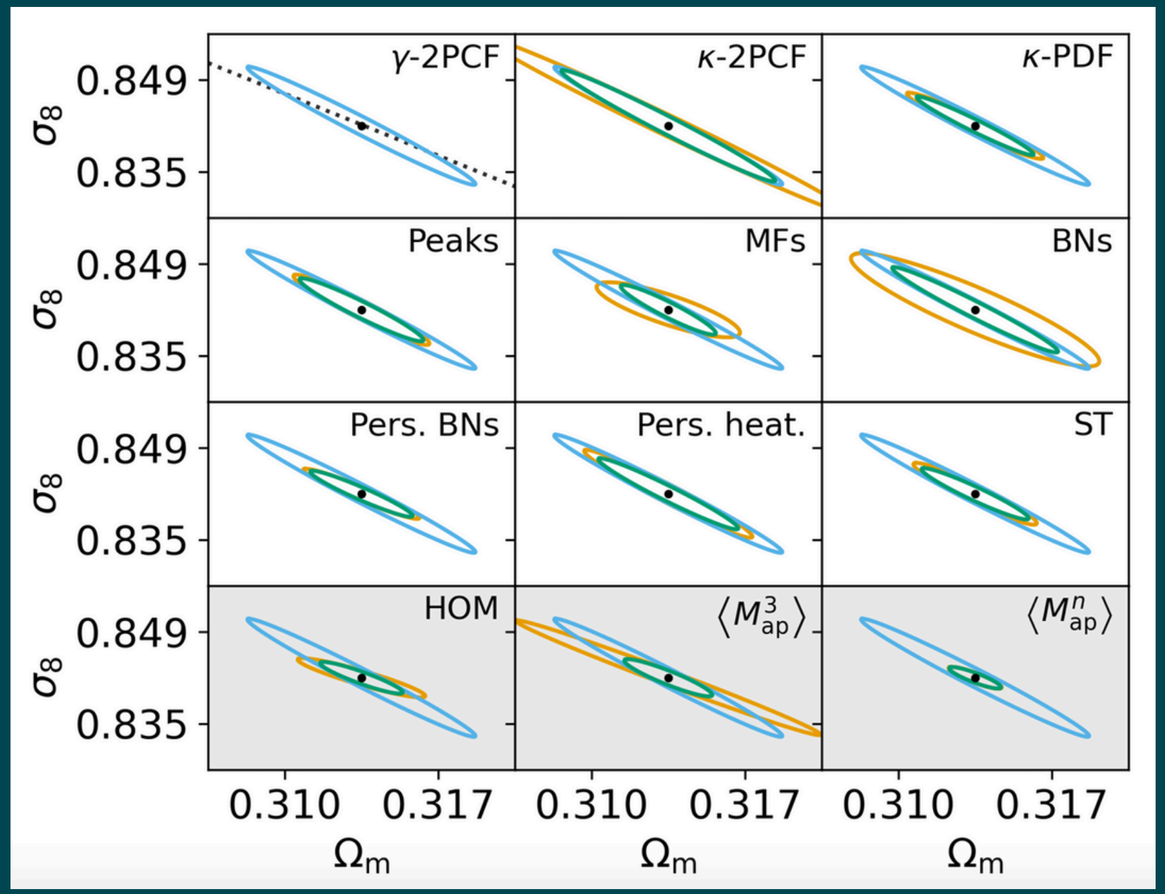
Impact of SSC

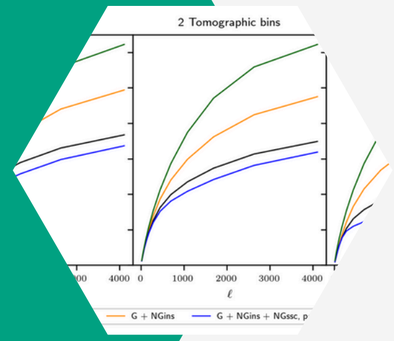
- large impact of SSC on WL only
- small impact of cNG on WL only
- impact on different parameters
  - small if not related to amplitude
  - depends on how many params
  - reduced if nuisance are added
- need to be updated including
  - survey mask
  - alternative binning strategies
  - weights and scale cuts



HOWLS

High Order WL Statistics

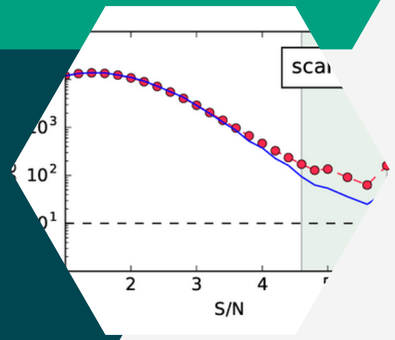




Local statistics

3pt CF

bispectrum



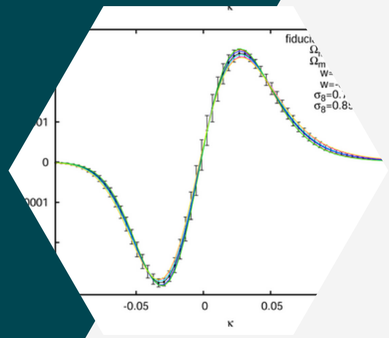
Global statistics

pdf

high order moments

scattering transform

peaks number counts



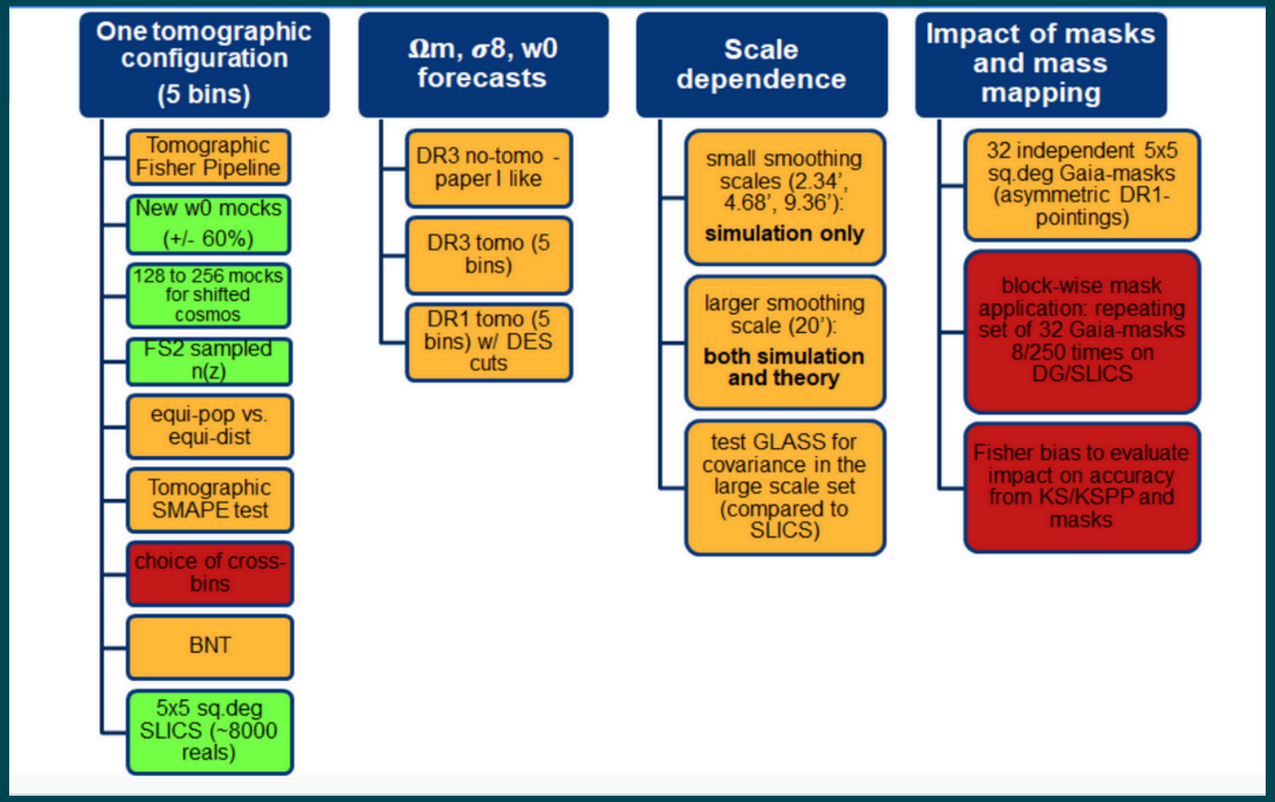
Topology

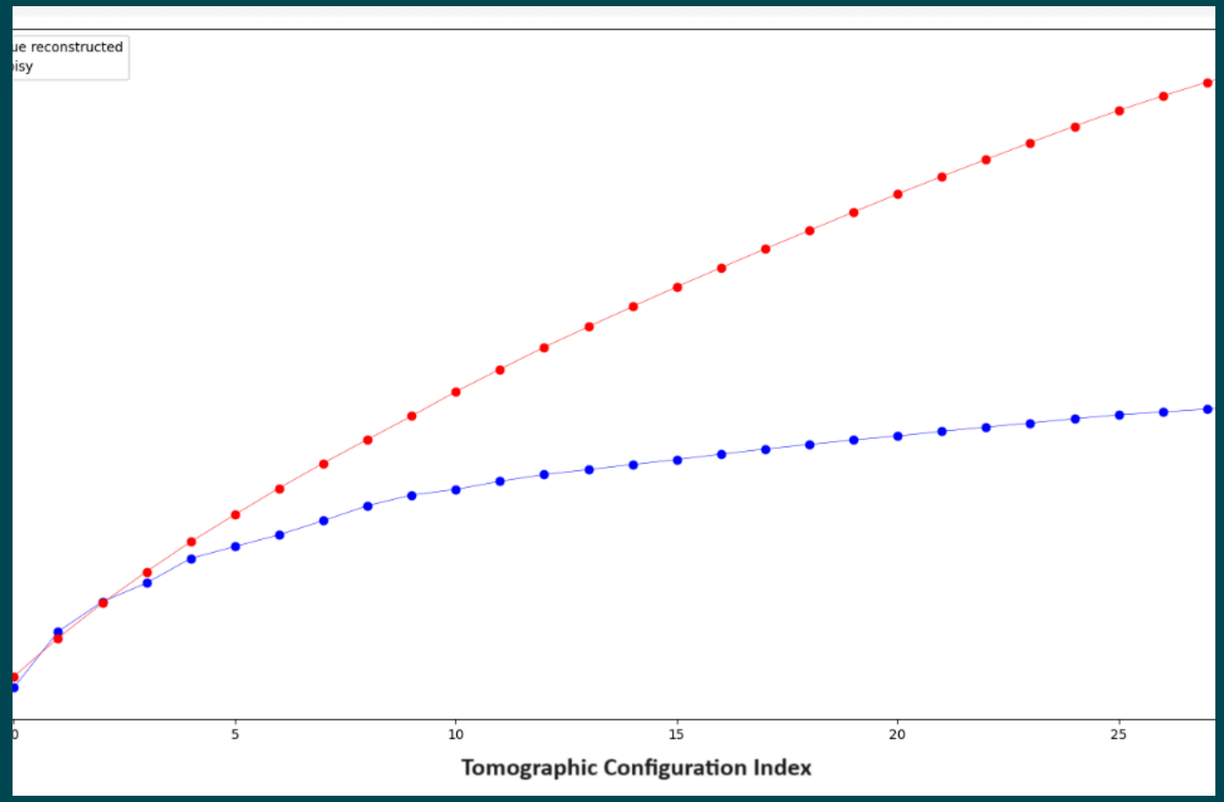
Minkowski functionals

Betti numbers

Persistence diagrams

HOWLS Activities





- optimising the tomographic approach in high order statistics
- looking for data compression techniques to reduce the need for simulations
- developing emulators for the likelihood analysis of actual DR1 and DR3 data

What’s Next for Rome1

Likelihood and Data Analysis

- develop CLOE v3 for the analysis of DR1 data
- join the team obtaining the first cosmological results

Covariance

- release Spaceborne within Euclid collaboration
- lead the comparison with numerical covariances

High Order Statistics

- emulators and models for topological probes
- check against simulations and apply to DR1 data