

1. title

VISTA-VIPERS: Is cosmic shear in tension with Planck?

2. abstract

First cosmic shear results from the ESO Kilo Degree Survey (KiDS) on the VST show a $\sim 2.5\sigma$ tension in the cosmological parameter $S_8 \equiv \sigma_8(\Omega_m/0.3)^{0.5}$ with respect to results from the Planck CMB satellite. Such a low amplitude S_8 was already hinted at in several previous cosmic shear surveys but the new KiDS results are arguably the most robust in terms of statistical precision as well as systematic error control. The dominant source of systematic error is the calibration of photometric redshifts. Inclusion of data from the overlapping VIKING survey on VISTA can significantly improve the redshift errors, but requires VST+VIKING images of deep spectroscopic survey regions for calibration. Whereas the VST is targeting these fields already, not all deep spectroscopic fields that are useful for this calibration are available in the VIRCAM archive: in particular the wide+deep VIPERS survey, which contains some 90,000 redshifts, is not covered. VISTA 5-band imaging on the VIPERS region will furthermore have significant legacy value, particularly for measuring stellar masses of the VIPERS galaxies.

7 A Scientific rationale

Our cosmological model, Λ CDM, is sufficiently strange that, despite its great success describing the Universe we observe, it warrants stringent testing. Gravitational lensing by large scale structure, a.k.a. cosmic shear, is becoming one of the most powerful probes of cosmology. Cosmic shear surveys have now progressed to the point that they yield uncertainties on some of the relevant cosmological parameters that can compete with the best other probes, in particular CMB experiments. In particular lensing can measure well the amount of clustered matter, summarized in the parameter $S_8 \equiv \sigma_8\sqrt{\Omega_m/0.3}$. Intriguingly, most cosmic shear measurements (but not all) measure S_8 values that are significantly lower than what is predicted by the best-fit Λ CDM model from the Planck CMB mission (see Fig. 1).

7B Immediate Objective