Space- vs. Ground-Based Observations

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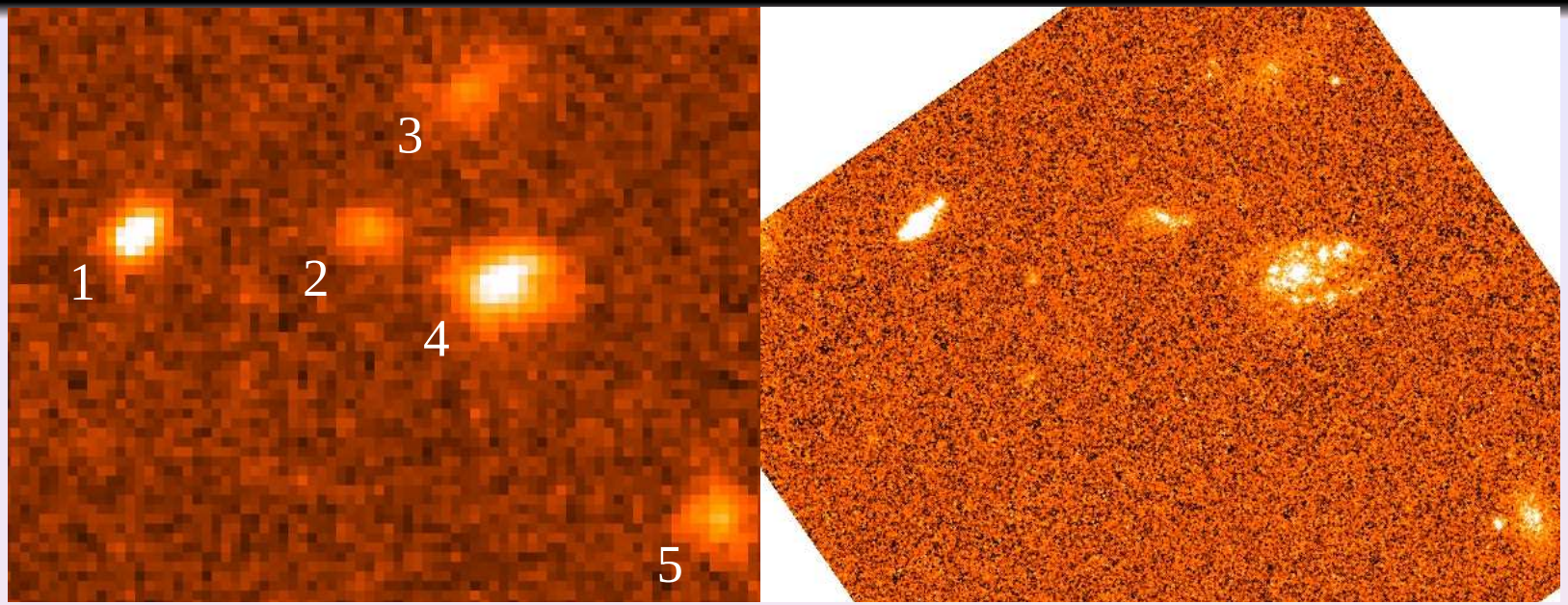


A $19'' \times 15''$ cutout of the A901 field
Left: WFI@2.2m (pixel scale: $0''.238$; seeing: $\approx 0''.8$).
Right: ACS@HST (pixel scale: $0''.03$).

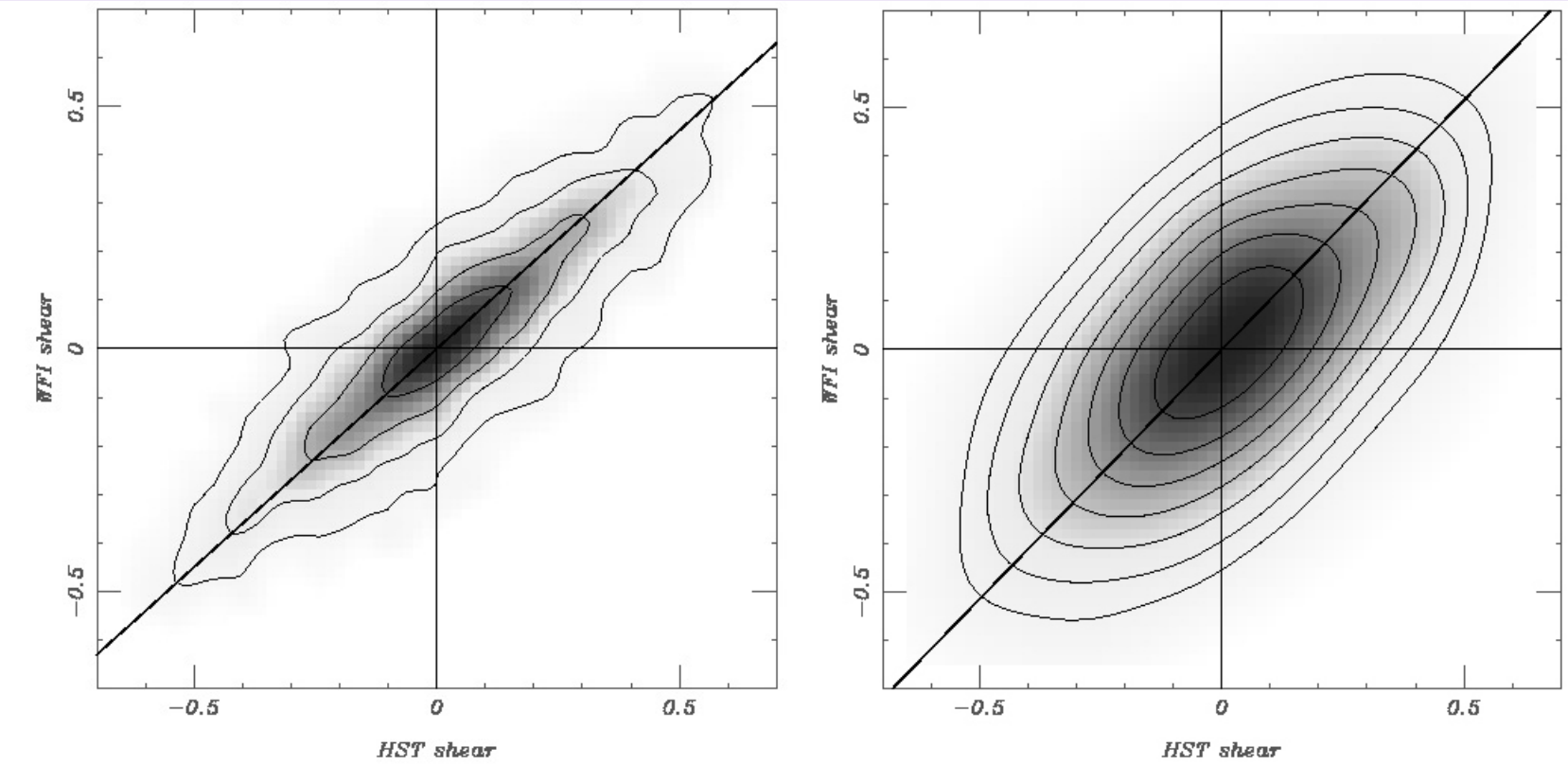
- Strong smearing effect of the Earth's atmosphere!
- KSB basically developed for ground-based data (assumption: isotropic PSF + small anisotropic part)
- HENCE: Do space-and ground-based observation yield similar results if KSB+ is used?

Space- and ground-based weak lensing pipelines (KSB+)

	space	ground
galaxy selection	$r_{\rm h} \in [2.8, 10]$ $\mathrm{tr}(P_{\rm g})/2 > 0.1$	$r_{\rm h} > r_{\rm h}^{*}$ $\mathrm{tr}(P_{\rm g})/2 > 0.1$
shear calibration	$\gamma/0.93$	$\gamma/0.93$
PSF anisotropy correction	template PSFs	low-order polynomial fit over the total FOV
integration of stellar images	out to $4.5 \times {\rm r_g}^{*}$	out to $3 \times {\rm r_g}^{*}$

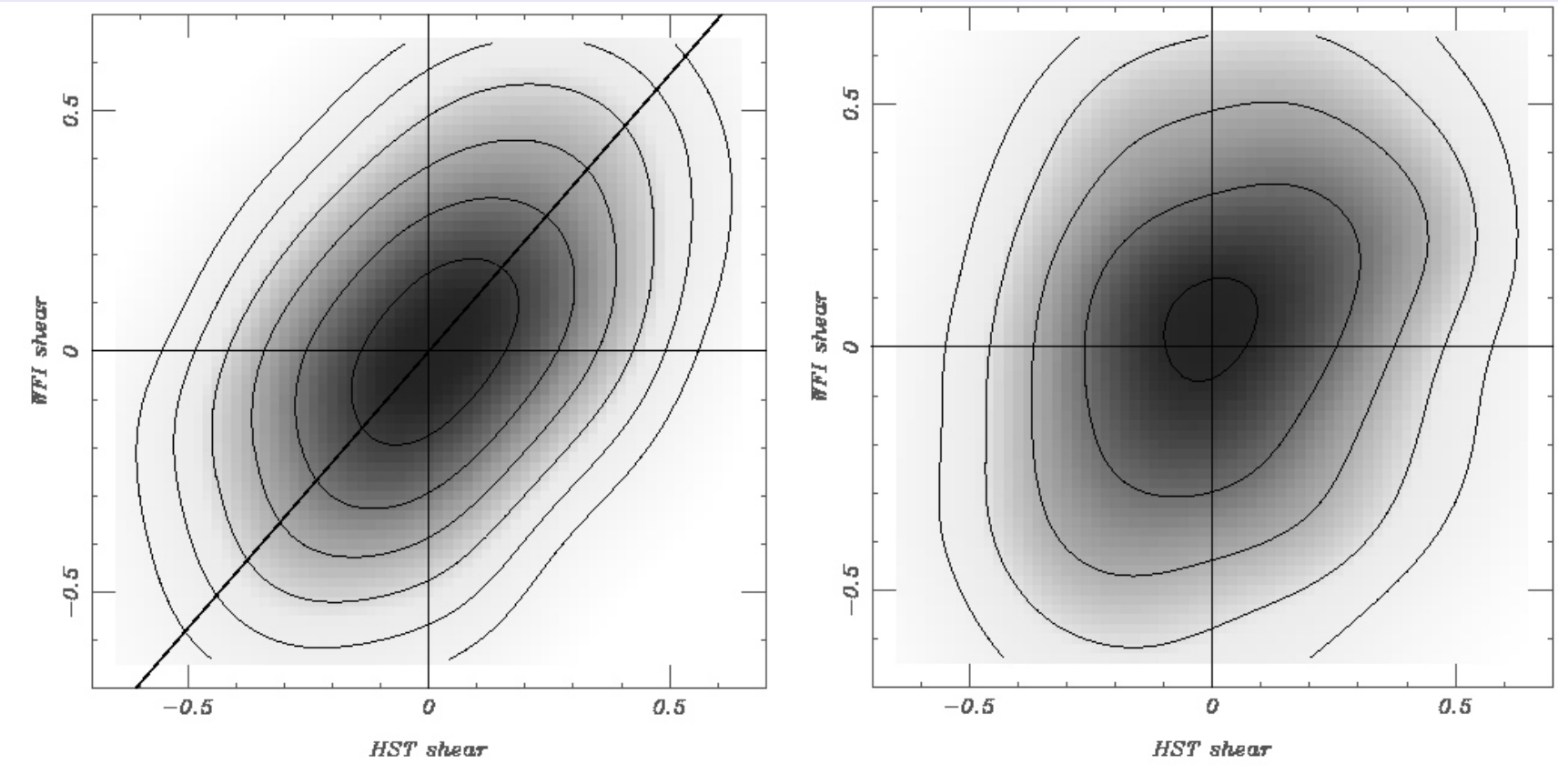
Common to both are the object detection with SExtractor, the shape measurements, interpolation across sub-pixel, and the use of the trace for $P_{\rm g}$.

A galaxy-by-galaxy comparison of the CDFS & A901 fields ($\sim$ 20000 galaxies)



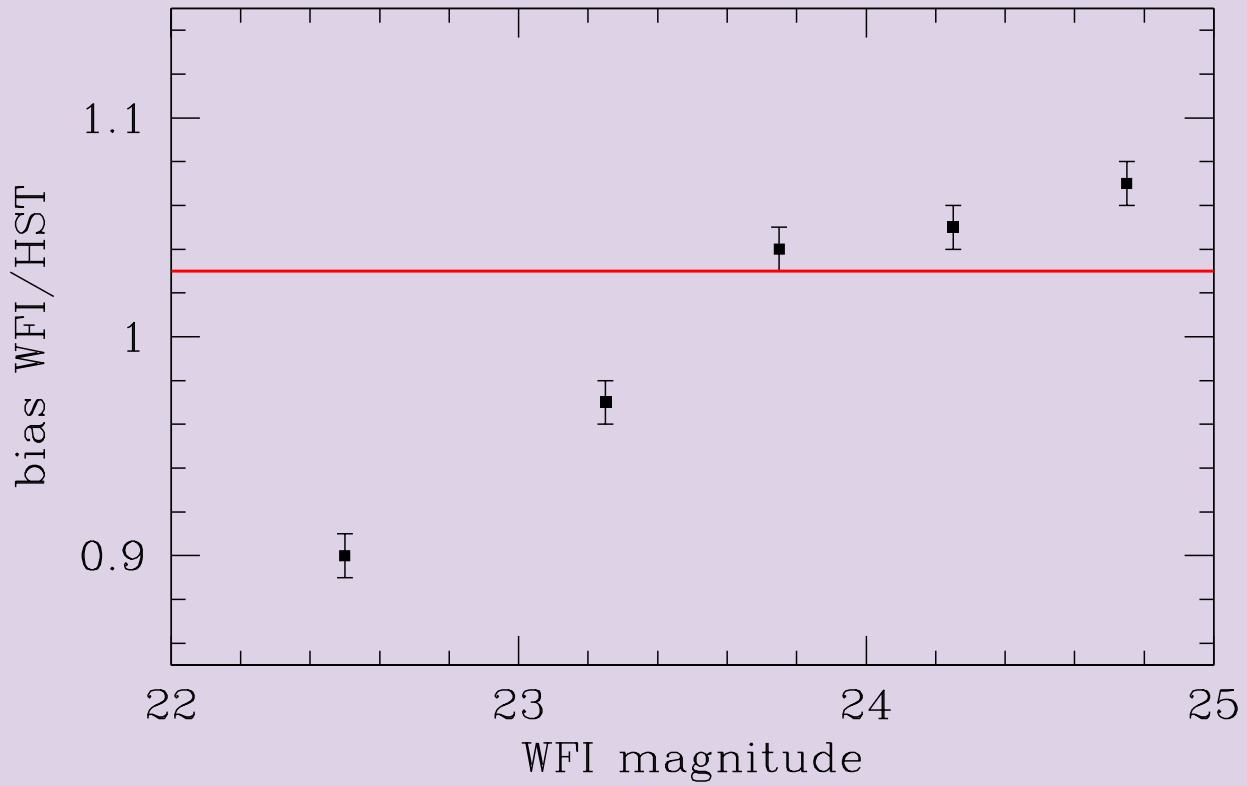
Left: $R \in [20, 23]$: γ_{ground} is underestimated by 8%.

Right: All galaxies usable for weak lensing studies ($snr > 5.0$).



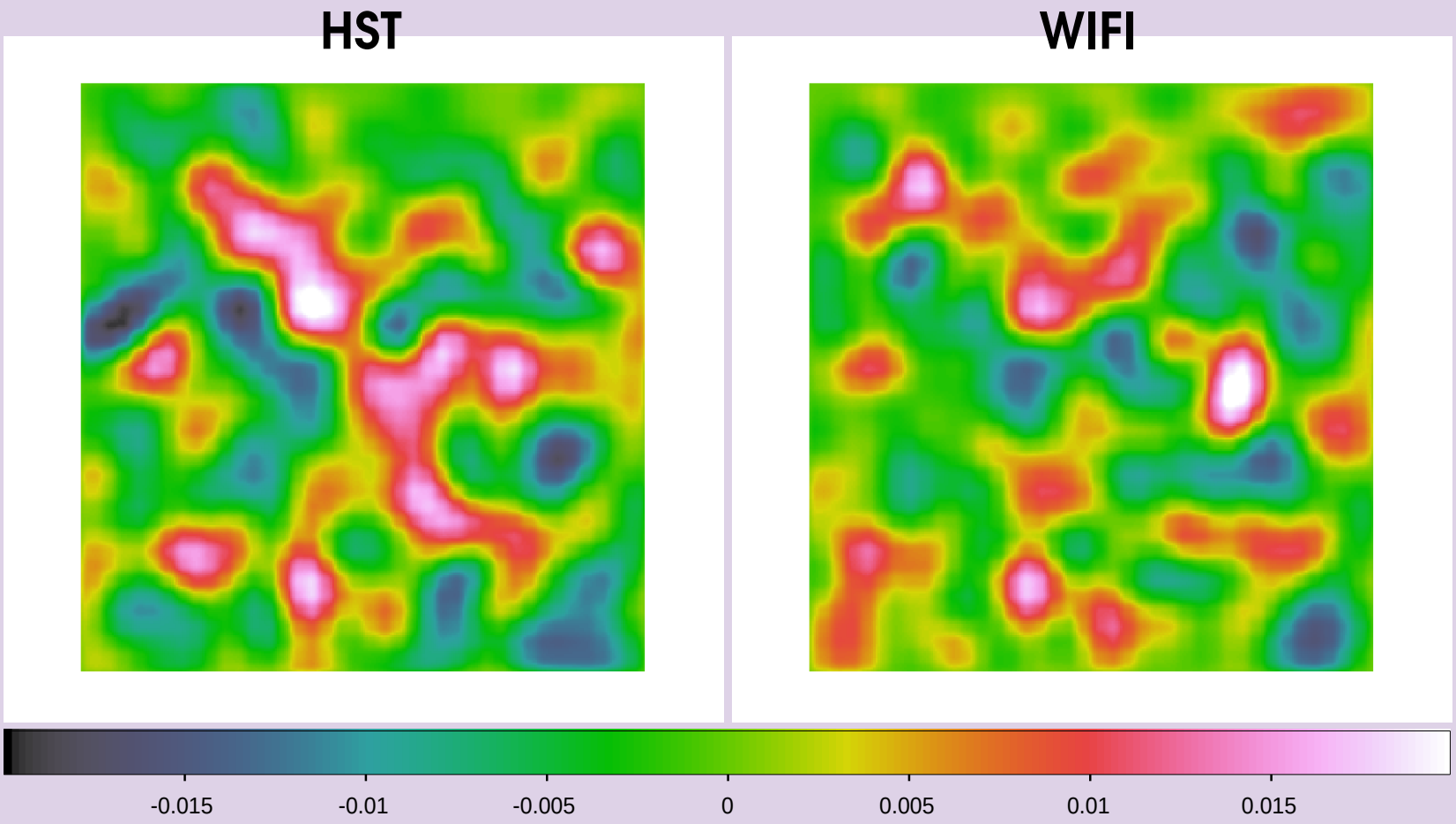
Left: Galaxies with $snr \in [4.0, 5.0]$.
Right: Ground-based shear measurements of galaxies with $snr < 4.0$ do not contain any shear information.

Calibration bias as a function of the ground-based magnitude ($snr > 5.0$)

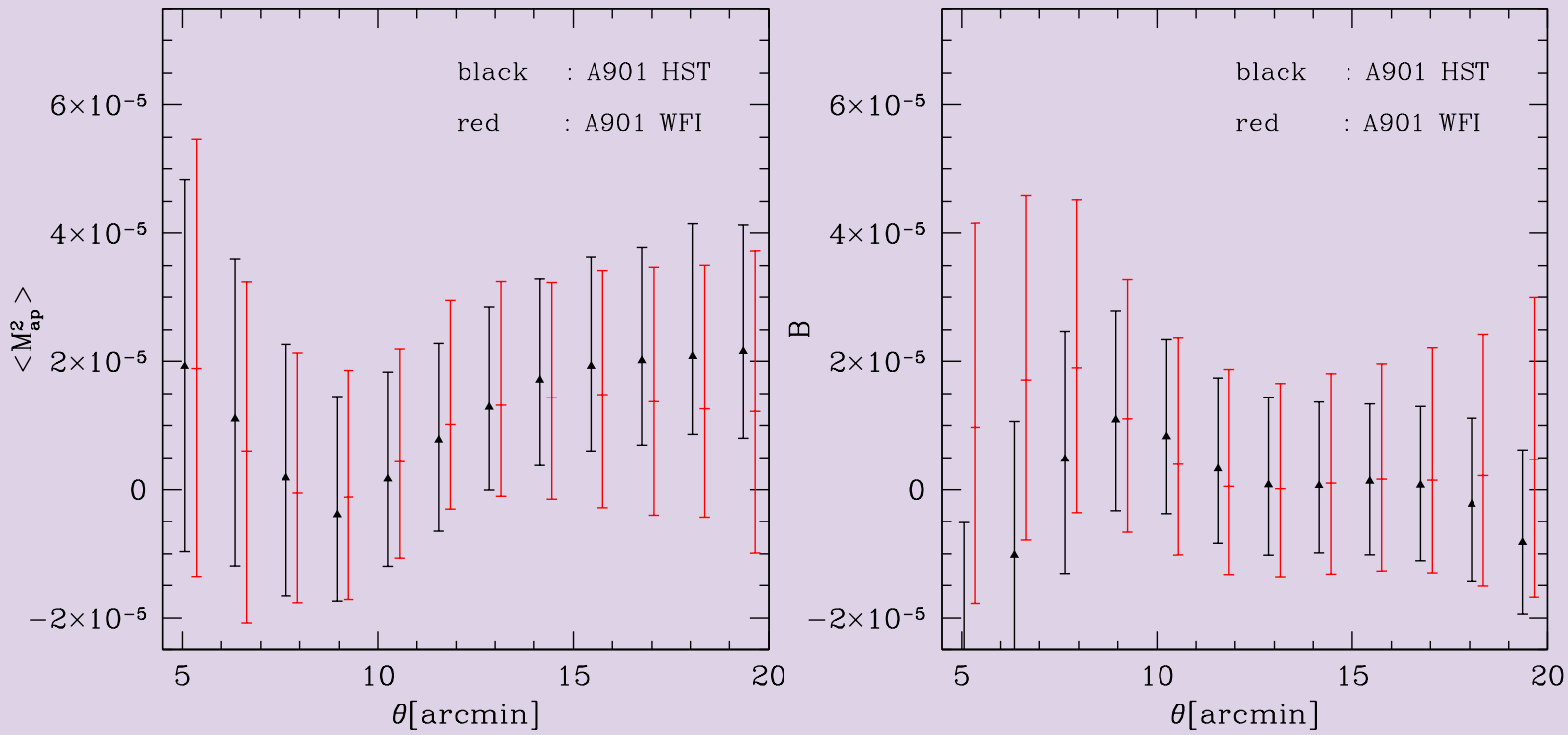


red line: average bias: γ(WFI) is on average 3% larger then γ(ACS)

κ-map of A901 ($\sim$ 8000 matched galaxies, $snr > 5.0$)

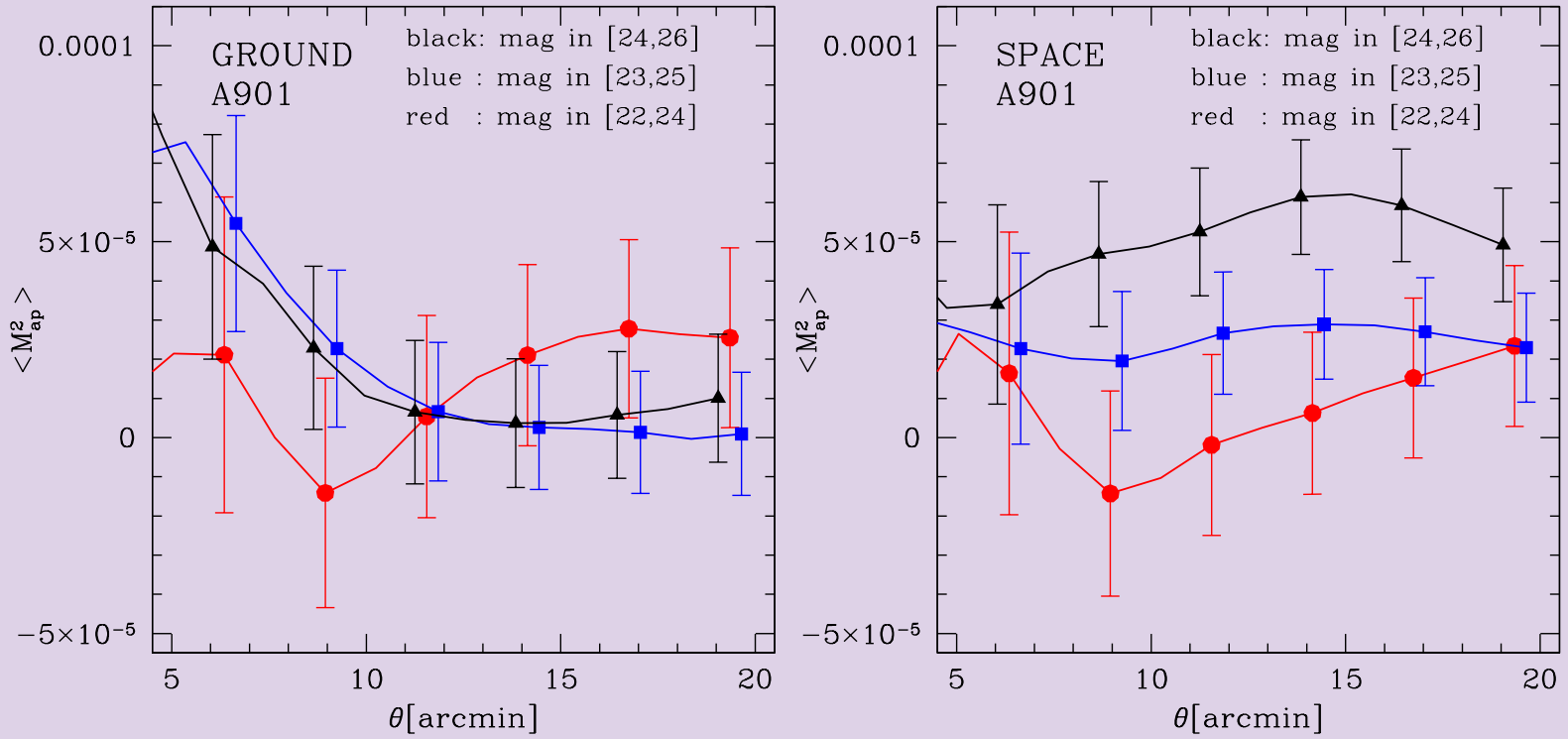


E- and B-modes from the matched catalogues of the A901 field ($\sim$ 8000 galaxies, $snr > 5.0$)



Left: E-modes, *right:* B-modes.

The strength of space-based data: DEPTH



$\langle M_{\rm ap}^2 \rangle$ for the matched space- and ground-based galaxy catalogues of A901 for three magnitude bins. No *snr* cut is performed.