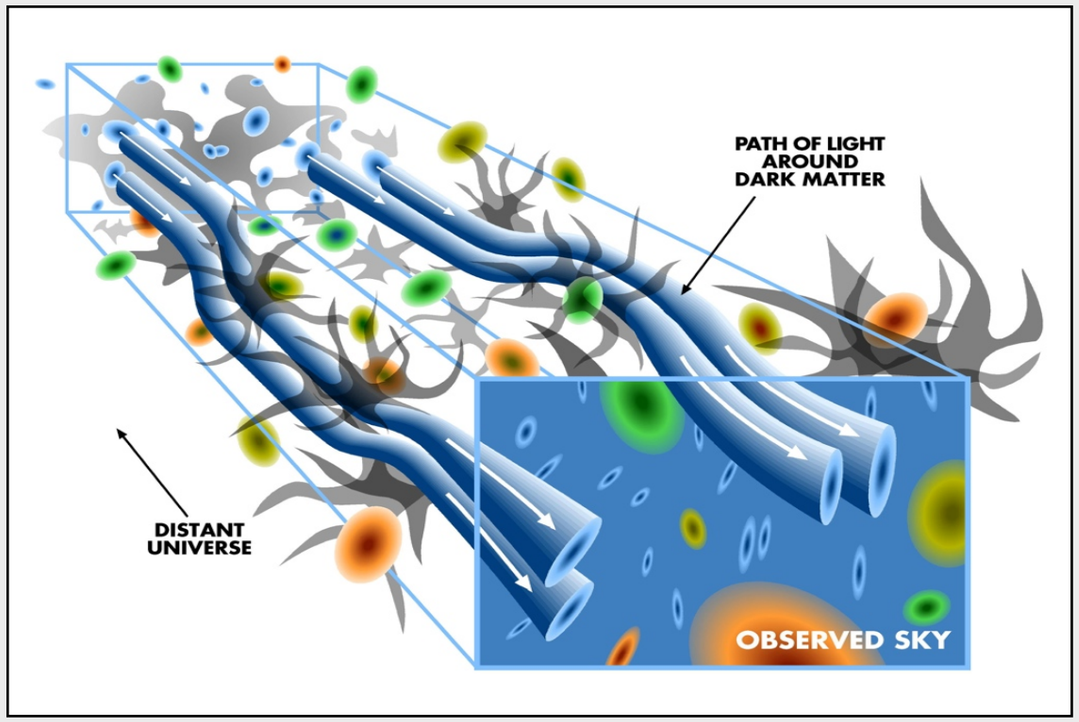
Radio weak lensing with the JVLA Sky Survey (arXiv:1312.5618)

• Weak Lensing (WL) is coherent distortion in shapes of distant galaxies due to light deflection caused by intervening mass distributions.

• Measure WL as fn. of redshift to constrain growth of DM structure and hence **probe physics of accelerating Universe**.



• Usually done in optical because of higher galaxy density but **new generation of radio telescopes offer exciting new ways to perform WL**:

✓ **Extend reach of WL to high-z** to provide more powerful redshift lever-arm for constraining dark energy physics.

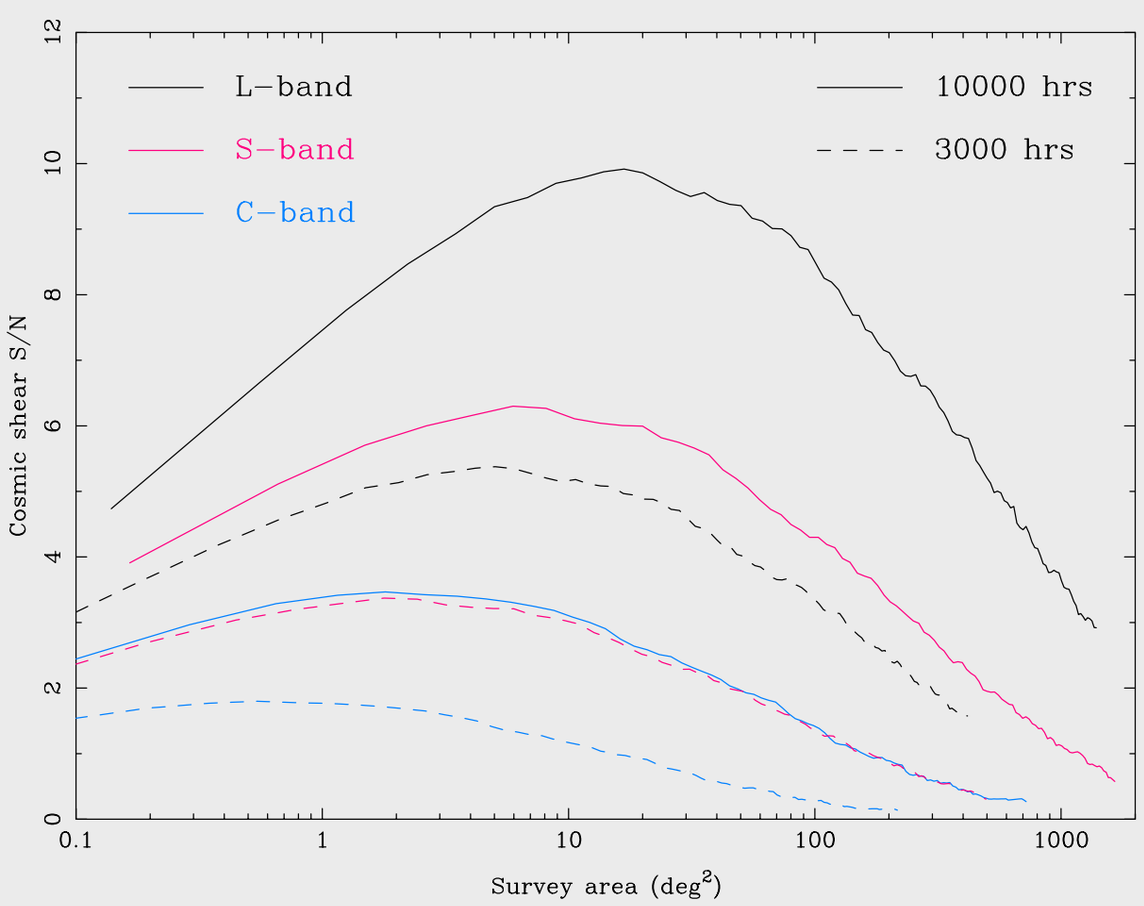
✓ Instrumental PSFs are severe problem in optical for measuring shapes. Radio telescopes have **stable/deterministic beams** ⇒ systematics less of a problem.

✓ Use **radio polarization to remove contamination from intrinsic galaxy alignments** - the key astrophysical systematic that limits WL at all wavelengths.

Optimal VLASS configurations for WL studies (see arXiv:1312.5618 for details)

- A JVLASS "deep fields" program would be optimal for this science area:
  - ★ Total area: ~10−20 square degrees.
  - ★ L-band observations to maximize galaxy number density.
  - ★ A-array configuration required for accurate galaxy shape measurement.

S/N of WL detection as function of survey area:



Predicted performance compared with leading optical surveys: