Added values of (spectro)polarimetry

- Low-order 3-D shapes of point sources
  - independent of distance (unlike interferometry, but at a tiny fraction of the cost)
  - separately for physically distinct regions
- Weak reflected-light signatures not otherwise distinguishable against a very high background
- Magnetic fields with synchrotron radiation
- Size, shape, and composition of dust particles
- Stellar magnetic field strengths

Tomographic power:

Spectro-polarimetry is particularly powerful when spectral lines permit zones with different dynamics, chemistry, excitation, etc. to be defined.

Additional differences in polarization can establish for each of these zones their own shape and orientation and so put them into one common 3-D perspective.

Examples: depth-dependent asymmetry of core-collapse SNe and GRBs; clumpiness and binarity of Type Ia SNe

Periscopic power:

- Some objects (e.g., LBVs, AGNs) are so heavily obscured that they are not directly observable.
- But some are structured such that light reflected off the envelope may still reach the observer.
- Only polarimetry can distinguish reflected photons from all the others.

Example: Scattered lines from an obscured broad-line region in otherwise narrow-lined AGNs (►unified model)

(Spectro)polarimetry

- is complementary - and partly even orthogonal – to other observing techniques
- can provide clues not otherwise obtainable
- measures the formation of structure at very early epochs (AGNs, GRBs)
- is a strictly differential (= accurate) method
- can exploit mildly non-photometric nights
- increases the cost of a spectrograph by just a few %
- requires LARGE telescopes (and high S/N), exploiting them on the D^4 curve