Fig 1. Experiment configuration top view. M1, M2, M3 are protected silver mirrors, S1 is a wedged BK7 beam splitter. The beam height is constant through the optical system.
Fig 2. Total scattering relative to Spectralon for three leaf samples

Fig. 3a. Measured scattering from *Arabidopsis thaliana* leaves, magnitudes using the PI technique. Error bars are ±1 std. See text for the notation. V(R), V(L) are not distinguishable at this scale except for a sign difference.
Fig 3b. Measured scattering from English Oak leaves, *Quercus robur*, magnitudes using the PI technique. Error bars are ±1 std.

Fig 3c. Measured scattering from *Ficus benjamina* leaves, magnitudes using the PI technique. Error bars are ±1 std.
Fig 4. Measured scattering from all leaf samples using the TAU technique. Error bars are ±1 std.

Fig 5. Derived coefficients for *A. Thaliana* using the PI data of Fig 3a, magnitudes only.
Fig 6a. Derived PI scattering coefficients $m_{41}$, $m_{21}$ for all leaves. Magnitudes

6b. Derived PI scattering coefficients $m_{42}$, $m_{24}$ for all leaves. Magnitudes.
Fig 7. TAU and PI measured coefficients for *A. thaliana*, different sample for each technique. *Q. robur* (Oak) and *F. benjamina* are similar with the same blue/UV characteristics but show smaller $m_{21}$ values at wavelengths $>700$nm.

Fig 8. Total scattering with respect to Spectralon for the cyanobacteria and lichen samples.
Fig 9. Measured (left circular) PI scattering $V(L)$ for the cyanobacteria and lichen samples. Magnitudes. Error bars are ±1 std.

Fig 10. Measured (s) PI scattering $Q(s)$ for the cyanobacteria and lichen samples. Magnitudes. Error bars are ±1 std.
Fig 11. Scattering coefficients $m_{41}$ and $m_{21}$ for samples exhibiting large polarization scattering at <370nm. Error bars are ±1 std.

Fig 12. Scattering coefficients $m_{41}$ and $m_{21}$ for samples with multiple scattering peaks and low polarization peaks at ~680nm. Error bars are ±1 std.
Fig 13. Scattering coefficients $m_{41}$ and $m_{21}$ for samples with broad features from 630-700nm and blue/UV polarization scattering peaks at ~400nm. Error bars are ±1 std.

Fig 14. Total scattering relative to Spectralon of substrates and non-biological samples.
Fig 15. Scattering coefficient $m_{41}$ measured with the TAU technique for substrate and selected lichen samples. Note the sign of the Red Paint sample indicating right elliptical scattering. Error bars are ±1 std.