The Mysterious Magic Number...

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Calibration Sphere

Rotating Polariser

Sim Filter (0.3nm FWHM)

IMSE

Wide Filter

Camera
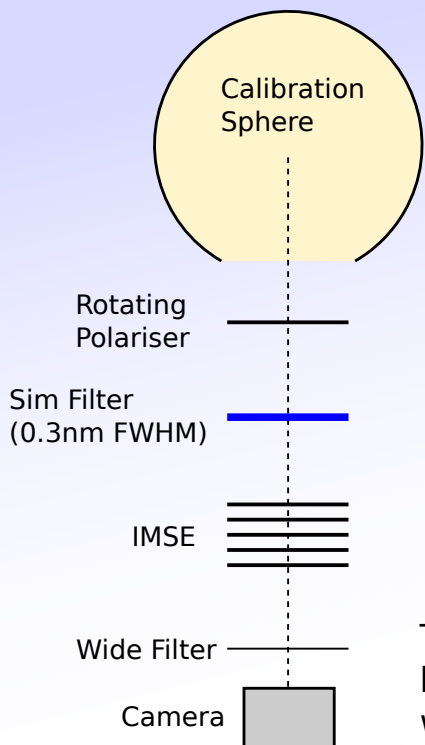
The simplest possible setup, does not give the expected result (and never did):

Target

Measured

Unexplained effect max at 22.5° in every 0 - 45°.

Polarisation Angle θ / °

Polariser Angle   360°
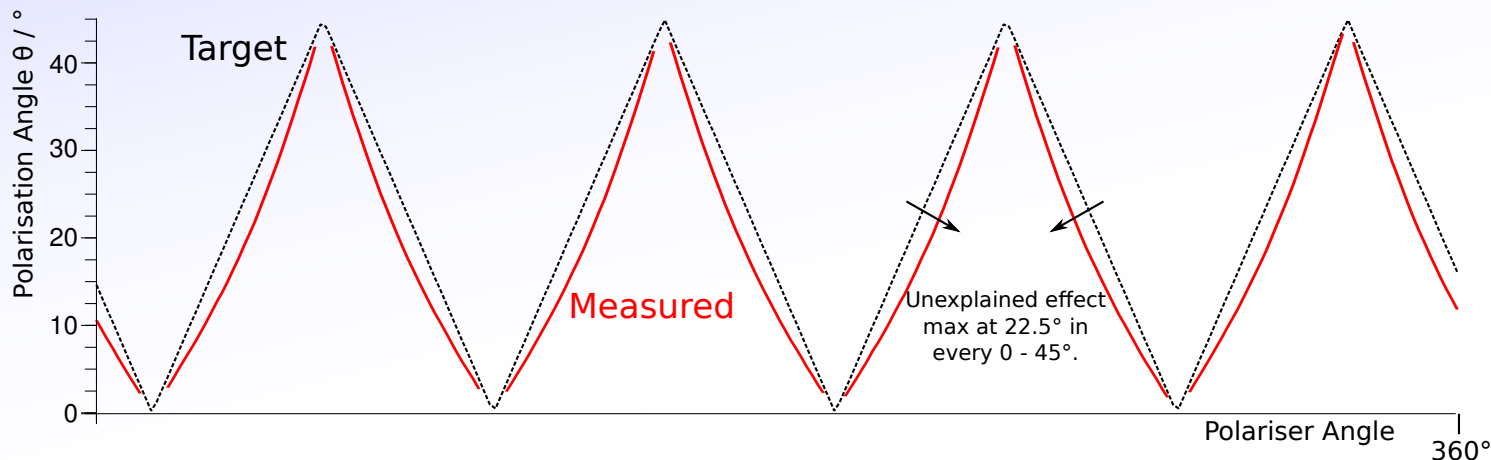
This also happened a bit with the MSE test setup. At the time, I hypothesised it was due to ±0.5° misalignments of the plates which scatter one FFT component outside the evaluated region.


(+,-) (+,0) (+,+)
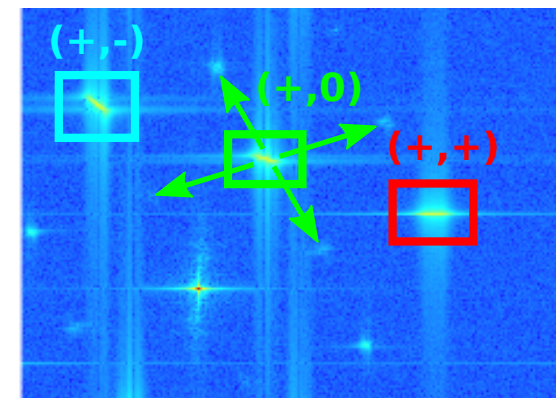
90% of the (+,0) component FFT power was outside, so I multipled it by 110% and it fixed the problem - one single number fixes the whole image at all angles.
 - the magic number was best at 89% and seemed to be fixed regardless of spectrum, rotation, ellipticity, plate angles etc.

However, for the calibration sphere, the magic number is 56%.

I think I've ruled absolutely everything else out, and the only thing left is that it has something to do with the light delivery. Something *seems* to vary with the area of the plates used. It is still very odd that it is constant for all angles (image positions), so... maybe not.

Lamp Lens

Virt. Img. Lens

IMSE Obj. Lens

Img.Lens
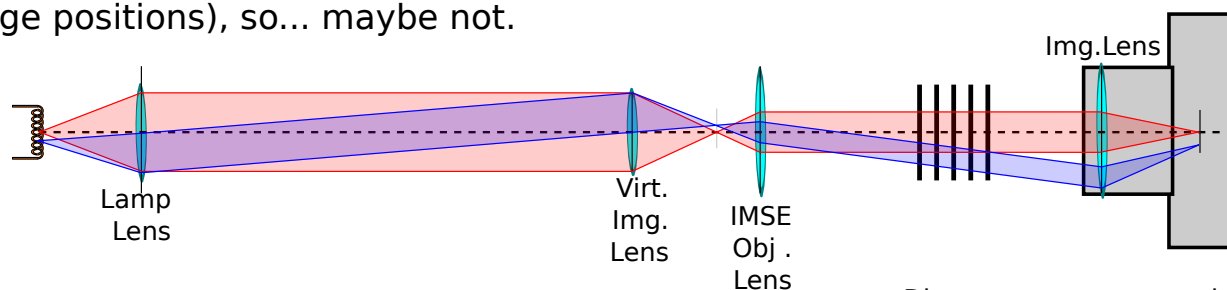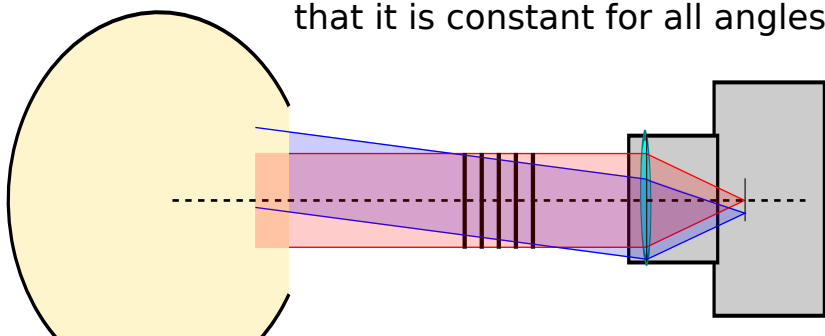
Any thoughts?

Diagrams are not to scale and are completely made up.