The optical quality of the eye is degraded by aberrations and scatter. Wavefront sensors are commonly used to measure the ocular aberrations but, are limited in their ability to detect high spatial frequency optical defects such as scatter or corneal scar. The double pass (DP) method is also a powerful means to assess the optical quality of the eye. However, traditional double pass methods also incur important loss of information as described below.

**Background**

**Theoretical benefit of AO double pass in the presence of ocular scatter**

0.5µm coma with no scatter

0.5µm coma with scatter and retinal reflection effects

AO DP could provide an accurate measure of the optical quality in the presence of ocular scatter.

**Artificial Eye**

RMS : 0.5µm

Single pass

Symmetric DP

MTF calculated from the measured images

Real eye’s aberration phase plate

RMS : 0.53µm

Single pass

Symmetric DP

MTF calculated from the measured images

**Real Eye**

Symmetric DP

Asymmetric DP

AO DP (6mm)

**Conclusions**

AO asymmetric double pass provides a more reliable estimate of the true optical quality of the eye than previously proposed methods including a wavefront sensor.