The Royal Academy of Engineering

Research Fellows

Adaptive nano-optics: enabling technologies for microscopy and engineering

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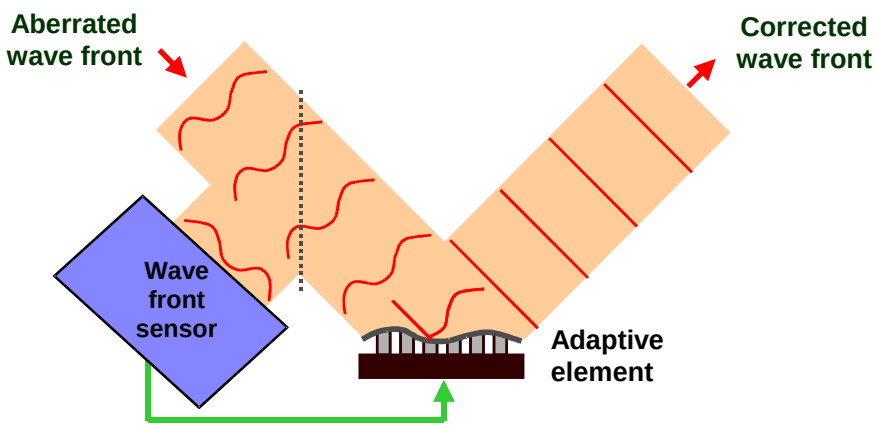
Many optical engineering techniques require precision on the sub-micrometre scale, but are adversely affected by aberrations, optical wave front distortions introduced by the specimen or substrate.

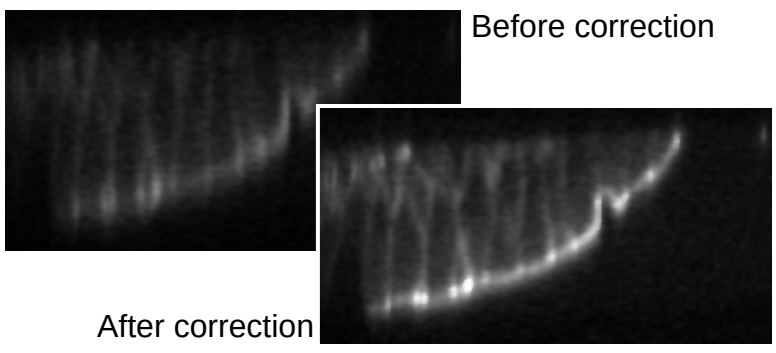
Adaptive optics was originally developed for telescopes to correct aberrations introduced by turbulence in the atmosphere. It enables the dynamic compensation of specimen/substrate induced aberrations, restoring resolution and precision at the diffraction limit.



Applications that benefit from adaptive optics include microscopy, optical manipulation, micromachining and optical data storage.

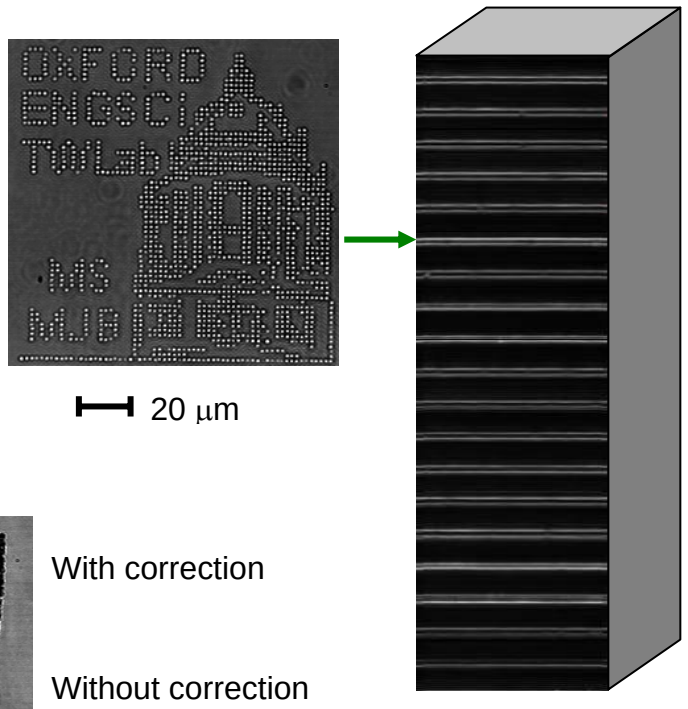
Biological microscopy

Fluorescence images – mouse intestine



Multilayer data storage

Data recorded in multiple layers



Micromachining

Channels machined within polymer substrate

25 μm