Characterization for Vision Science Applications of a Bimorph Deformable Mirror in a Closed Loop Adaptive Optics System

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Wave front correcting adaptive optics is a giant leap in optical resolving technology. The deformable mirror (DM) wave front corrector is the most expensive part of the AO system. New, low cost deformable mirrors are appearing on the market more and more often. The Aoptix bimorph deformable mirror, originally developed for high bandwidth laser communications, has been tested. Past research has shown that the bimorph mirror is excellent at correcting low order aberrations. This mirror has been tested in a closed loop AO system by introducing aberrations and measuring how well the mirror can correct and what order aberrations the mirror can correct well. Aberrations are introduced physically using trial lenses and simulated using MATLAB for higher order aberrations. If results follow expectations, higher performance AO systems utilizing two DMs will soon come into use. The bimorph will correct low order aberrations and another mirror type, for example, MEMS, will correct for higher order aberrations.