Comparison of Aberration Correction Methodologies

Patrick Dahl  
*Illinois Wesleyan University*

Carl Mueller  
*Illinois Wesleyan University*

Nathanial Wolanyk  
*Illinois Wesleyan University*

Evan Baker  
*Illinois Wesleyan University*

Gabriel Spalding, Faculty Advisor  
*Illinois Wesleyan University*

Follow this and additional works at: [https://digitalcommons.iwu.edu/jwprc](https://digitalcommons.iwu.edu/jwprc)

Part of the [Physics Commons](https://digitalcommons.iwu.edu/jwprc)

Dahl, Patrick; Mueller, Carl; Wolanyk, Nathanial; Baker, Evan; and Spalding, Faculty Advisor, Gabriel, "Comparison of Aberration Correction Methodologies" (2011). *John Wesley Powell Student Research Conference*. 7.  
[https://digitalcommons.iwu.edu/jwprc/2011/posters/7](https://digitalcommons.iwu.edu/jwprc/2011/posters/7)

This Event is protected by copyright and/or related rights. It has been brought to you by Digital Commons @ IWU with permission from the rights-holder(s). You are free to use this material in any way that is permitted by the copyright and related rights legislation that applies to your use. For other uses you need to obtain permission from the rights-holder(s) directly, unless additional rights are indicated by a Creative Commons license in the record and/ or on the work itself. This material has been accepted for inclusion by faculty at Illinois Wesleyan University. For more information, please contact [digitalcommons@iwu.edu](mailto:digitalcommons@iwu.edu).  
©Copyright is owned by the author of this document.
COMPARISON OF ABERRATION CORRECTION METHODOLOGIES

Patrick Dahl, Carl Mueller, Nathanial Wolanyk, Evan Baker and Gabriel Spalding*
Physics Department, Illinois Wesleyan University

We began the term by re-designing a complex optical system, so as to minimize the number of elements required, while at the same time adding a pair of acousto-optic deflectors (AODs) to the existing system, which included a Spatial Light Modulator (SLM) and a research-grade fluorescence microscope. For every element added to the optical path there is some amount of insertion loss (i.e., a reduction in the transmitted intensity). So, in part, the reduction in the number of optical elements was aimed at reducing the integrated insertion loss. Also of great significance, for our application, is the need to reduce the overall aberration present in the system. Our goals for the immediate future are to assess the effectiveness of (and trade-offs associated with) several independent techniques for aberration correction, including one of our own design. We have worked together to develop and incorporate original code for manipulation of the active elements in this system, as will be demonstrated in the talk.