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## **Title**

On the Retrieval of the Beam Transverse Wind Velocity Using Angles of Arrival from Spatially Separated Light Sources

## **Authors**

Shiril Tichkule, *University of Massachusetts Amherst* Follow

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## Abstract

For optical propagation through the turbulent atmosphere, the angle of arrival (AOA) cross-correlation function obtained from two spatially separated light sources carries information regarding the transverse wind velocity averaged along the propagation path. Two methods for the retrieval of the beam transverse horizontal wind velocity,  $v_t$ , based on the estimation of the time delay to the peak and the slope at zero lag of the AOA cross-correlation function, are presented. Data collected over a two week long experimental campaign conducted at the Boulder Atmospheric Observatory (BAO) site near Erie, CO was analyzed. The RMS difference between 10 s estimates of  $v_t$  retrieved optically, and 10 s averages of the transverse horizontal wind velocity measured by an ultrasonic anemometer, was found to be 14 cm/s for the time-delay-to-peak method and 20 cm/s for the slope-at-zero-lag method, for a 2 h period beginning 0345 MDT on 16 June, 2010, during which the transverse horizontal wind velocity varied between -1 m/s and 2 m/s.

## First Advisor

Andreas Muschinski

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