Investigation of spherical aberration effects on coherent lidar performance

In this paper we demonstrate experimentally the performance of a monostatic coherent lidar system under the influence of phase aberrations, especially the typically predominant spherical aberration (SA). The performance is evaluated by probing the spatial weighting function of the lidar system with different telescope configurations using a hard target. It is experimentally and numerically proven that the SA has a significant impact on lidar antenna efficiency and optimal beam truncation ratio. Furthermore, we demonstrate that both effective probing range and spatial resolution of the system are substantially influenced by SA and beam truncation.

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