

TECHNIQUE FOR OBTAINING VERTICAL PROFILES OF  
BACKSCATTERING AND EXTINCTION CROSS SECTIONS  
USING SLANT PATH LIDAR MEASUREMENTS

J. D. Spinhirne, B. M. Herman and J. A. Reagen

ABSTRACT

A method is presented for solving for vertical profiles of atmospheric particulate extinction and backscattering cross-sections utilizing monostatic lidar slant path measurements. The method is an extension of work by Fernald<sup>1</sup>. It is shown that the number of assumptions necessary for an iterative solution of extinction and backscattering cross sections can be reduced if lidar slant path measurements are used to solve directly for optical depths.

The technique is useful only if sufficiently accurate lidar measurements are available. With highly accurate measurements it is also possible to solve directly for extinction cross sections without an iterative solution of a transcendental equation if the proper reduction scheme is used. The required accuracy is discussed and results showing the effect of errors are presented.

<sup>1</sup> F. G. Fernald, B. M. Herman and J. A. Reagen, Journal of Applied Meteorology, Vol. 11, No. 3 (1973).