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Short Communication

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Determination of Atmospheric Aerosol Particle Size Distribution with Multi Wavelength Lidar

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Abstract

Aerosols belong to main components of atmosphere. Understanding their optical properties and the distribution in the atmosphere is crucial for assessing their role in local and global scale. Active remote sensing with multi-wavelength lidars are especially useful for atmospheric investigation since they enable determination of range resolved Aerosol Particle Size Distribution (APDS). The sensing consists in sending of laser pulses at several wavelengths λ (λ = 1, 2, …, Λ). The light that is backscattered at distance z reaches the lidar receiver, where wavelength separated and digitized. In consequence it provides the signals S1(z), S2(z), …, SΛ(z): Here z0 corresponds to lidar position, Aλ are the wavelength dependent apparatus constants while αλ(z) and βλ(z) denote the spatial distribution of total atmospheric extinction and backscattering coefficients respectively: Where, QA and QB are absorption and scattering efficiencies, both depending on particle radius r. Therefore, the inversion of multi-wavelength lidar signals can provide n(r,z) function – range resolved APDS. During our presentation a method and software to retrieve profiles of APSD from lidar signals will be presented. Their application for experimental studies of maritime aerosol as well as the properties of aerosol under cumulus cloud base will be presented.

Biography:

T Stacewicz has completed his PhD from Faculty of Physics at University of Warsaw (Poland). He is a Professor at this University. His scientific activity concerns optics, laser spectroscopy and its application in atmospheric sciences and in medicine. He has published more than 90 papers in reputed journals.