

Lidar development for hyper-dense remote observation of urban atmosphere

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Information of atmospheric temperature and water vapor density are most important factor for the prediction of air pollution, an analysis of the nature of the heat island phenomenon and the prediction of localized heavy rain in urban area. We are developing practical instruments for remote measurements of atmospheric temperature and water vapor density distributions with sub-kilometer range resolution.

For water vapor concentration distribution measurement, we propose a differential absorption lidar (DIAL) using diode laser based transmitters. For temperature measurements in daytime, we propose a high-spectral-resolution lidar (HSRL) using a potassium Faraday filter. The Faraday filter acts as a blocking filter for suppression of narrow Mie scattering, and a very narrow filter for getting temperature information from Doppler-broadened Rayleigh spectrum.

Keywords: hyper-dense observation, lidar, atmospheric temperature, water vapor density, remote sensing