Development of semiconductor laser based Doppler lidars for wind-sensing applications

We summarize the progress we have made in the development of semiconductor laser (SL) based Doppler lidar systems for remote wind speed and direction measurements. The SL emitter used in our wind-sensing lidar is an integrated diode laser with a tapered (semiconductor) amplifier. The laser source is low-cost and compact - enhancing the potential of lidar wind sensors for mass production. This paper describes two embodiments of the patented wind lidar technology and presents experimental results that evaluate the wind sensors' performance. Due to compactness, portability and cost-efficiency, SL based wind sensors have a strong potential in a number of applications such as wind turbine control, wind resource assessment, and micrometeorology (e.g. as alternative to the construction of meteorological towers with anemometers and wind vanes).