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The measurement of atmospheric transmittance based on 4.4μm laser heterodyne radiometer

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A laser heterodyne radiometer which was used for atmospheric transmittance measurement was developed. Laser heterodyne spectroscopy is a high sensitive laser spectroscopy technique which offers the potential to develop a compact ground or satellite based radiometer for Earth observation. A 4.4μm external cavity quantum cascade laser with a wide spectral tuning range (4.38μm to 4.52μm) was used as the local oscillator. The performance of the developed laser heterodyne radiometer was evaluated by measuring of CO_2 spectral at different pressures, and the spectral resolution of the developed laser heterodyne spectroscopy is about 0.008cm-1. An inter-comparison measurement of atmospheric transmittance with the developed laser heterodyne radiometer and FTS was carried out. Analyzed result shown that there was a high relevancy (>92%) between two groups of data.