

Abstract Submitted  
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**Terahertz absorption spectrum of water vapor at different humidity at room temperature** XUYING XIN, HAKAN ALTAN, DAVID MATTEN, ANGELAMARIA SAINT, ROBERT ALFANO, Institute for Ultrafast Spectroscopy and Lasers, Physics Department, the City College of New York — We measured the absorption spectrum of water vapor in 0.2-2.4THz range at different humidity from 17% to 98% at room temperature using Er: doped fiber laser (IMRA America Inc.) based terahertz time-domain spectroscopy. The experiments were performed in a nitrogen-purged cage at atmosphere environment to obtain the reference and water absorption information. The seventeen absorption lines were observed due to water molecular rotations in the ground vibration state. The first three absorption lines at low frequencies increase with humidity, following the Beer-Lambert Law, while some of high frequency lines were found to decrease with humidity. These effects will be discussed. The observed line broadening is due to collisions occurring among water and nitrogen molecules.

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