



# Experimental Verification of the Chemical Sensitivity of Two-Site Double Core-Hole States Formed by an X-ray FEL

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We have performed X-ray two-photon photoelectron spectroscopy (XTPPS) using the Linac Coherent Light Source (LCLS) X-ray free-electron laser (FEL) in order to study double core-hole (DCH) states of CO<sub>2</sub>, N<sub>2</sub>O and N<sub>2</sub>. The experiment verifies the theory behind the chemical sensitivity of two-site (ts) DCH states by comparing a set of small molecules with respect to the energy shift of the tsDCH state and by extracting the relevant parameters from this shift.

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