

Abstract Submitted  
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**Direct measurement of core-level relaxation dynamics on a surface- adsorbate system** JING YIN, LUIS MIAJA-AVILA, GUIDO SAATHOFF, CHAN LA-O-VORAKIAT, MARGARET MURNANE, HENRY KAPTEYN, JILA, University of Colorado, STEFAN MATHIAS, MARTIN AESCHLIMANN, Univ. of Kaiserslautern, Germany, MICHAEL BAUER, Christian-Albrechts-Universität zu Kiel — Electronic coupling between an adsorbate and the surface on which it resides is fundamental to the understanding of many surface interactions. However, the interaction of highly-excited adsorbate states is an area that has been explored only indirectly to-date. In this work, we present the first direct time-resolved observations of the lifetime of core-excited states of an atom adsorbed onto a surface. By implementing laser-assisted Auger decay on an adsorbate/surface system, we directly measure the lifetime of the 4d-1 core level of Xenon on Pt(111) to be  $7.1 \pm 1.1$  fs. This result opens up time domain measurements of highly-excited state dynamics in materials systems where, because of complex interactions, energy-resolved measurements provide incomplete information.

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