

Abstract Submitted  
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**Raman scattering study on the hidden order and antiferromagnetic phases in  $\text{URu}_{2-x}\text{Fe}_x\text{Si}_2$** <sup>1</sup> HSIANG-HSI KUNG, Rutgers University, SHENG RAN, NORAVEE KANCHANAVATEE, University of California San Diego, ALEXANDER LEE, VIKTOR KRAPIVIN, KRISTJAN HAULE, Rutgers University, M. BRIAN MAPLE, University of California San Diego, GIRSH BLUMBERG, Rutgers University — The heavy fermion compound  $\text{URu}_2\text{Si}_2$  possesses an unusual ground state known as the “hidden order” (HO) phase below  $T = 17.5\text{ K}$ , which evolves into an large moment antiferromagnetic (LMAFM) phase under pressure. A recent Raman scattering study shows that an  $A_{2g}$  symmetry ( $D_{4h}$ ) in-gap mode emerges in the HO phase, characterizing the excitation from a chirality density wave<sup>2</sup>. Here, we report Raman scattering results for single crystal  $\text{URu}_{2-x}\text{Fe}_x\text{Si}_2$  with  $x \leq 0.2$ , where the Fe substitution acts as chemical pressure, shifting the system’s ground state from HO to LMAFM. We found that the  $A_{2g}$  mode softens with doping, vanishes at the HO and LMAFM phase boundary, then re-emerges and hardens with doping in the LMAFM phase. The relations between the  $A_{2g}$  mode energy and the strength of the HO/LMAFM order parameters will be discussed in this talk.

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<sup>2</sup>H. Kung, R.E. Baumbach, E.D. Bauer, V.K. Thorsmølle, W. Zhang, K. Haule, J.A. Mydosh and G. Blumberg *Science* **347**, 1339 (2015)

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