

**Marie-Aude MEASSON**  
(Université Paris Diderot-Paris7,

Laboratoire Matériaux et Phénomènes Quantiques)

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Room René Pauthenet (2nd floor, building J - LNCMI) - 25 rue des martyrs [[Access Map](#)]

Alliance 5 "Supra"



## **RAMAN SIGNATURES OF THE HIDDEN ORDER STATE AND THE KONDO PHYSICS OF THE HEAVY-FERMION SUPERCONDUCTOR URu<sub>2</sub>Si<sub>2</sub>**

### **Summary :**

We have performed polarized electronic Raman scattering on single crystals of URu<sub>2</sub>Si<sub>2</sub> down to 8K in the hidden order (HO) state and under magnetic field up to 10T.

The HO state is characterized by a sharp excitation at 1.75meV and a gap in the electronic continuum below 6.8meV. Both Raman signatures are of pure A<sub>2g</sub> symmetry. By comparing the behavior of the sharp excitation and the resonance at E<sub>0</sub> observed by neutron scattering at Q<sub>0</sub>=(0,0,1), we provide strong evidence that the HO state presents a new translational symmetry along the z-axis such that  $\Gamma$  and Z points fold on top of each other. The observation of these distinct Raman features of the peculiar A<sub>2g</sub> symmetry as a signature of the hidden order phase places strong constraints on current theories of the hidden order.

The Kondo cross-over is characterized by a large gap opening at high energy, symmetry restricted to the E<sub>g</sub> symmetry. Thanks to Raman vertex calculation, we attribute this gap to interband excitation.