

Colloquium Frontiers of Condensed Matter Physics

Dedicated to Prof. Nicolás Cabrera (1913-1989)

2018



**"Heavy, heavier,
the softest"**
Silke Paschen

10/12

When: 10 December at 12h 30.
Where: Sala de conferencias, módulo 00,
Facultad de Ciencias, UAM

Vienna University of Technology.

Heavy electrons to explore correlated quantum matter.

Heavy fermion compounds are ideal model systems to explore quantum phases and fluctuations driven by correlations. The effective mass of the conduction electron is not only "heavy", but can become even heavier and drive the system towards a quantum critical point, where the mass may diverge and a continuum of excitations leads to exotic properties not described by the standard Fermi liquid theory. The associated accumulation of entropy makes the material extremely soft to the formation of new phases, including unconventional forms of superconductivity.

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Universidad Autónoma
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FACULTAD DE CIENCIAS

Fundación **BBVA**

Matter.

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Speaker: Silke Paschen, Vienna University of Technology, Austria.

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lectronic correlations are a central theme in contemporary condensed matter physics – and hold promise for new functionality in quantum materials. In this talk I will show that heavy fermion compounds are ideal model systems to explore quantum phases and fluctuations driven by correlations. The effective mass of the conduction electron in a heavy fermion metal is not only ‘heavy’, but can become heavier and heavier on driving the system towards a quantum critical point, where the mass may ultimately diverge. At this point, a critical continuum of excitations leads to exotic properties not captured by the standard theory of metals, Fermi liquid theory. The associated accumulation of entropy makes the material extremely soft to the formation of new phases, including unconventional forms of superconductivity.