

# Chez Pierre

Presents ...

**Monday, November 22, 2021**

**12:00pm Noon**

## **Chez Pierre Seminar**

**Silke Paschen** – Vienna University of Technology

**"Superconductivity in the extreme strange metal  $\text{YbRh}_2\text{Si}_2$  "**

Heavy fermion compounds are a versatile platform to explore quantum phases and fluctuations in the regime of extreme correlation strength, with bandwidths renormalized by several orders of magnitude compared to the free electron case. A prominent example for this physics is  $\text{YbRh}_2\text{Si}_2$ . Its best-known characteristic is a fan of linear-in-temperature electrical resistivity emerging from a magnetic-field induced quantum critical point (QCP), in a background of Fermi liquid behavior. Across this QCP, the Fermi volume jumps [1]. More recently, THz conductivity measurements revealed that this jump is associated with a dynamical electron localization–delocalization transition featuring energy-over-temperature scaling [2] and that, at ultralow temperatures, unconventional superconductivity condenses out of the material's "extreme strange metal" state—now with linear resistivity over 3.5 orders of magnitude in temperature [3]. I will discuss how these findings may relate to strange metal superconductors in other materials classes.

[1] S. Paschen and Q. Si, *Nat. Rev. Phys.* **3**, 9 (2021).

[2] L. Prochaska et al., *Science* **367**, 285 (2020).

[3] D. H. Nguyen et al., *Nat. Commun.* **12**, 4341 (2021).

