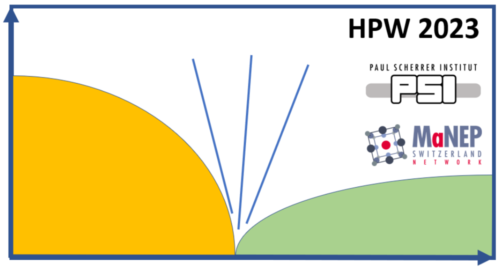

Contribution ID: **10** Type: **Talk**

Pressure tuning of quantum matter: A local-probe perspective

Wednesday, 22 November 2023 16:30 (15 minutes)

The demanding experimental conditions required to access the quantum critical behavior of many materials (including high magnetic fields, high pressures, and ultra-low temperatures), make their microscopic investigation often problematic. Over the years, techniques such as the nuclear magnetic resonance and muon-spin rotation/relaxation have emerged as complementary, well suited (and often unrivalled) methods up to the challenge.

Here, we focus on the effects of high pressure on strongly-correlated quantum matter, as observed from the local-probe perspective of nuclei (NMR) and muons (μSR). Pressure tuning is used to establish phase diagrams, induce phase transitions, and identify critical points. By means of selected examples, comprising low-dimensional magnets [1,2], unconventional superconductors [3], and heavy-electron systems [4], we show how the delicate balance between competing ground states, reflecting close-lying energy scales, is modified by pressure. We conclude with recent developments in uniaxial strain experiments, where the breaking of rotational lattice symmetry can provide access to the underlying symmetries.

Despite the many challenges involved with high-pressure experiments, once the associated technical difficulties are overcome, even conventional materials are shown to exhibit extraordinary properties, as demonstrated by the record-breaking *T_c* superconducting hydrides [5,6].

References

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Primary author: SHIROKA, Toni (PSI - Paul Scherrer Institut)

Presenter: SHIROKA, Toni (PSI - Paul Scherrer Institut)

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