

## Strongly-correlated electronic properties of quasicrystals

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Since the discovery of non-Fermi liquid properties such as divergent behavior of the electronic specific heat coefficient and the uniform magnetic susceptibility as  $T \rightarrow 0$  in Au-Al-Yb quasicrystal (QC) [1,2], strongly correlated effects in electronic properties of QCs have gathered much attention. In this lecture, I discuss a possible origin of the unconventional low temperature properties, which are often called unconventional quantum critical phenomena, in Yb-based QCs with mixed valence.

I will start with a pedagogical introduction to heavy fermion physics, focusing on non-Fermi liquid features of them. I will then give a brief review of the unconventional quantum critical phenomena observed in the Au-Al-Yb QC [1] and its relevant approximant crystal (AC) [3]. A recent experimental study on the Yb-based QCs using a bulk-sensitive hard x-ray photoemission spectroscopy technique will be presented to clarify the origin of the unconventional quantum critical phenomena in the Yb-based mixed-valence QCs. If I have a time, I will also review superconducting properties of Al-Zn-Mg QC [5], the only superconducting QC ever discovered.

### References:

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