Quantum excitations of "hidden orders" and thermal transports of "hidden particles"

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"Hidden order", that was first proposed for URu2Si2, has been a long-standing issue in modern condensed matter physics. Here we provide new insights about the identification of the nature of the hidden orders. We apply our insights to the understanding of the peculiar quantum orders and excitation spectra in the triangular lattice magnet TmMgGaO4. In the second part of the talk, we will provide new insights about the emergent Lorentz force on the neutral particles in spin liquids and explain the physical origin of the thermal Hall effects of these topological excitations.