

# **COLLOQUIUM**

**Department of Physics, Temple University**

**Beyond Triplet: Experimental Evidence of High-Spin  
Superconductivity**

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## **Abstract**

In all known fermionic superfluids, Cooper pairs are formed by spin-1/2 electrons that are bound together in either spin-singlet or spin-triplet states. The "spin" of a Bloch electron, however, is fixed by the symmetries of the crystal and the atomic orbitals from which it is derived, and can in principle behave as if it were a higher spin (e.g. 3/2, 5/2...) particle. The superconducting state of such a system allows pairing states to form "beyond triplet", with higher spin quasi-particles combining to form quintet or even septet pairs. After reviewing our research program on quantum materials, I will focus on our evidence for the first experimentally realized case of a high-spin fermionic superfluid in the exotic superconducting state of the half-Heusler compound YPtBi, as well as the rich landscape of ground states and intertwining orders found in the X-Y-Z family of materials.

**Monday, April 10, 2017**

**SERC, Room 116**

**Refreshments served at 2:45 pm**