High-spin quasiparticles in solid states

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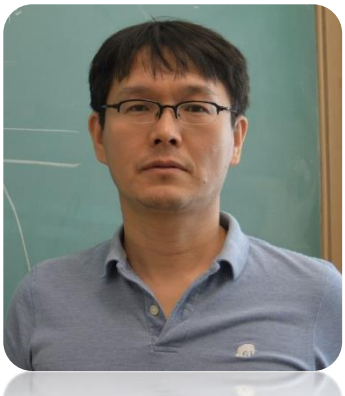

Chemistry Seminar on *Magnetic Quasiparticles*

Monday Sept 26 at 4 pm in 303 Schrenk

Please contact Dr. Amitava Choudhury at choudhurya@mst.edu for further information.

Abstract: Quasiparticles with total angular momentum greater than j=1/2 can emerge in a solid state with strong spin-orbit interaction. While the existence of such high-spin quasiparticles has been known for decades, their implication has been largely overlooked. The possibility of superconductivity beyond spin-triplet in such solid states attracted substantial attention. In this talk, I will talk about unconventional quantum oscillations and superfluid response in half-Heusler YPtBi which is a topological semimetal with j=3/2 quasiparticles. The angle-dependent quantum oscillation exhibits striking anisotropy, and the London penetration depth varies as almost temperature-linear, both of which are not easily expected in a compound with cubic symmetry. These anomalous behaviors can be explained within j=3/2 Fermi surface and high-spin superconductivity.

About the speaker: Dr. Hyunsoo Kim is an assistant professor of physics at the Missouri University of Science and Technology (Missouri S&T). He joined the faculty in 2022. Before he arrived at S&T, Dr. Kim had been a research assistant professor at Texas Tech University since 2020. Dr. Kim worked at Maryland Quantum Materials Center as an assistant research scientist and postdoctoral associate for six years. Dr. Kim received a Ph.D. at Iowa State University in experimental condensed matter physics specializing in mK investigation. His research focuses on superconductivity and magnetism in strongly correlated and topological materials and utilizes various low-temperature techniques including 0.001 ppm precision measurement of ac magnetic susceptibility.