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Quantum Criticality in high purity specimens of $Ce_2Rh_3Ge_5$ and $Ce_2Pt_3Si_5$ ERIC D. BAUER, RYAN E. BAUMBACH, XIN LU, Los Alamos National Laboratory, ROSS D. MCDONALD, Los Alamos National Laboratory, National High Magnetic Field Laboratory, FILIP RONNING, JOE D. THOMPSON, Los Alamos National Laboratory — We report results for high purity specimens of the heavy fermion antiferromagnets $Ce_2Rh_3Ge_5$ and $Ce_2Pt_3Si_5$, which have similar ordering temperatures: T_N = 5.5 K and 6.3 K, respectively, and belong to the same family of materials that includes the pressure-induced superconductor $Ce_2Ni_3Ge_5$. Our measurements show that the antiferromagnetic state is suppressed to zero temperature at similar magnetic fields (H_c = 23 T and 36 T, respectively), suggesting comparable magnetic energy scales in these compounds. In contrast, while the pressure needed to access a quantum critical point (QCP) in $Ce_2Rh_3Ge_5$ is extremely low ($P_c \sim 5$ kbar), the Néel temperature for $Ce_2Pt_3Si_5$ is insensitive to pressures up to 15 kbar. This result implies that although these compounds are markedly similar, the mechanism that drives the QCP in $Ce_2Rh_3Ge_5$ is not present in $Ce_2Pt_3Si_5$. We discuss possible differences between these compounds and mechanisms for their quantum criticality with an emphasis on how the shape of the Fermi surface affects their physical properties.

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