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The Field-Temperature Phase Diagram of the Heavy Fermion Compound Ce_2Ge_2Mg WILLIAM GANNON, MOOSUNG KIM, LIUSUO WU, Stony Brook University, MEIGAN ARONSON, Stony Brook University and Brookhaven National Laboratory — The heavy fermion metal Ce_2Ge_2Mg has a layered structure with the Ce nearest neighbor pairs arranged orthogonally to one another in the tetragonal *a*-*b* plane, a structure topologically equivalent to the Shastry-Sutherland lattice (SSL). This material is thought to be more two dimensional than other R_2T_2X SSL compounds such as Yb_2Pt_2Pb, due to the relatively long distance along the *c*-axis between Ce atoms in adjacent SSL planes. The magnetic phase diagram of Ce_2Ge_2Mg has been determined for magnetic fields in the SSL plane and along the *c*-axis, for temperatures from the antiferromagnetic transition at $T = 9.4$ K in zero applied field down to $T = 1.8$ K and fields as high as 14 T using magnetization, resistance, and heat capacity. Our measurements show a complex phase diagram with field suppressing the antiferromagnetic transition and the emergence of several ordered phases. These phases are possible evidence for singlet-to-triplet excitations in the Ce dimers.
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