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Antiferromagnetic order in the Cd_6R (R = rare earth) quasicrystal approximants[1] ALAN GOLDMAN, MIN GYU KIM, Ames Laboratory and Iowa State University, GUILLAUME BEUTIER, SIMaP, UMR 5266 CNRS Grenoble-INP UJF, ANDREAS KREYSSIG, Ames Laboratory and Iowa State University, TAKANOBU HIROTO, TSUNETOMO YAMADA, Tokyo University of Science, JONG WOO KIM, Argonne National Laboratory, MARC DE BOISSIEU, SIMaP, UMR 5266 CNRS Grenoble-INP UJF, RYUJI TAMURA, Tokyo University of Science — Many theoretical treatments of spins on aperiodic lattices support the notion of long-range antiferromagnetic order. However, to date, there has been no experimental confirmation of long-range magnetic order in quasicrystalline systems. The absence of long-range magnetic order extends to crystalline approximant phases of the icosahedral structures as well. Surprisingly, the 1/1 approximant to the Cd-Mg-R icosahedral phases, Cd_6R, appears to be an exception to the rule. Here, we report on the results of x-ray resonant magnetic scattering measurements on Cd_6R approximants which show that long range antiferromagnetic order is, indeed, realized. For R = Tb and Ho, viewing the structure as a body-centered cubic packing of Tsai clusters, we find that the R ions associated with the icosahedral cluster at the corner of the unit cell are antiferromagnetically correlated with the R ions associated with the icosahedral cluster at the body-center of the unit cell.

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