Antiferromagnetic order in the half-Heusler phase TbPdBi

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In recent years, half-Heusler compounds became particularly attractive from the point of view of their possible topologically non-trivial electronic structure. Antiferromagnetic half-Heusler compounds are especially interesting due to the fact that some of them were theoretically predicted to be antiferromagnetic topological insulators [1,2]. In fact, antiferromagnet GdPtBi has recently been verified experimentally as a Weyl semimetal [3]. In this work, we studied single crystals of TbPdBi, another representative of the group of half-Heusler bismuthides. By means of magnetic susceptibility, heat capacity, electrical resistivity, magnetostriction and thermal expansion measurements, the compound was characterized as an antiferromagnet with the Néel temperature $T_N \approx 5.3\,\mathrm{K}$. Neutron diffraction experiment confirmed the antiferromagnetic ordering and yielded the propagation vector $k = (0.5, 0.5, 0.5)$. Remarkably, this k vector is in accord with the theory of antiferromagnetic topological insulators [1] and equal to that reported for GdPtBi [2].

References:

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