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Structure and phase transitions of a magnetic kink crystal SEBASTIAN MUEHLBAUER, ANDREY ZHELUDEV, ETH Zurich, Neutron Scattering and Magnetism Group, Switzerland, EKATERINA POMJAKUSHINA, PSI, Villingen, Switzerland — The insulator $Ba_2CuGe_2O_7$ crystallizes in the noncentrosymmetric space group $P-4_21m$ allowing for the Dzyaloshinskii-Moriya interaction. Below T_N=3.2K $Ba_2CuGe_2O_7$ exhibits an almost antiferromagnetic cycloidal magnetic order. For H parallel to the c-axis, the cycloid distorts to solitions or kink domain walls. Using small angle neutron scattering and neutron diffraction the structure and phase transitions of a magnetic kink crystal have been examined in $Ba_2CuGe_2O_7$. A magnetic phase transition seen with SANS and complementary measurements of the magnetization is interpreted in terms of a transition from a Neel domain wall with the propagation vector *parallel* to its plane of spin rotation to a Bloch domain wall with a propagation vector *perpendicular* to its plane of spin rotation. Indicated by the occurrence of satellite reflections with even and odd harmonics around the AF Neel point (1,0,0) and around the FM zone center (0,0,0) it was further shown that the AF cycloidal magnetic structure of $Ba_2CuGe_2O_7$ is considerably distorted by the staggered Dzyaloshinskii vector D_z.

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