AND angle increases with decreasing temperature to of the above quoted data suggests that these intermetallic compounds exhibit unusual magnetic properties which may be explained by the competition of large magneto-cyclostatic and exchange anisotropies similar to those found in other rare earth iron monogermanides. "ErCu2" crystallizes in the CeCu2 orthorhombic structure (Imma) with the rare earth atoms at the 4a positions and the Cu atoms at the 8h positions. "ErCu2" orders magnetically at 11.8K. Further, the temperature dependence of the ac-susceptibility and electrical resistivity revealed anomalies at T1=(6.1±1)K and T2=(4.3±1)K. For a better understanding of the magnetic structure of "ErCu2", powder neutron diffraction studies have been performed between 1.6 and 15K, and at room temperature in zero applied magnetic field. These studies revealed an incommensurate antiferromagnetic structure below 11.8K with the propagation vector presumably along the b-axis of the orthorhombic crystal structure. Near both T1 and T2 the diffraction patterns show changes of the magnetic structure at 6.3K which probably connected to changes of the modulation wave vector. The data will be analyzed by means of powder profile analysis. Attempts will be made to correlate the resulting models of the magnetic structure to the results of macroscopic magnetic measurements.

Iron monogermanide, FeGe, is known to exist in three polymorphs with monoclinic, hexagonal and cubic structures, respectively (Richardson, M. (1967). Acta Chem. Scand. 21, 2305). Hexagonal FeGe has the B-35 type structure (P6/mmm) and is antiferromagnetic below Tc = 410K with the spins parallel to the c-axis. Earlier susceptibility measurements by Beckman, Carrander, Lebech, and Richardson (1972) Plastica Scripta 6, 151) indicate that the spins tilt away from the c-axis below ~30K and form an antiferromagnetic cone structure. Below 30K several field induced spin rearrangements have been seen by Beckman et al and Stanstrom and Sundström. Our neutron diffraction studies show that already below ~5K the structure changes to a c-axis double cone antiferromagnetic structure with an interlayer turn angle for the basal plane moment component of ~94.4° independent of temperature and applied field. This corresponds to a periodicity of ~100Å. A reinterpretation of the above quoted data suggests that these findings are consistent with the macroscopic magnetic measurements and not inconsistent with earlier neutron diffraction data. The cone half angle increases with decreasing temperature to ~140° at 4.2K, as can be seen in Fig. 1, and its temperature dependence shows a pronounced kink at ~7K, indicating a phase change at this temperature.

At 4.2K we observe an anomalous decrease of the basal plane moment component at a critical field of 1.4 Tesla applied perpendicular to the c-axis. With increasing temperature the critical field decreases and the anomaly becomes less pronounced. The cone structure is found to persist up to at least 3.9 T (910C), which was the upper limit of the applied field used so far. Further measurements with higher fields and with fields along the c-axis are in progress.

Fig. 1. Cone half angle α in FeGe (B35) calculated from experimental data assuming a double cone antiferromagnetic structure. The angle α is the angle with which the iron moments are canted away from the c-axis. Also shown are the cone half angles determined by Forsyth et al. and that calculated by Beckman et al.