Monoclinic FeCl$_2$·2H$_2$O orders antiferromagnetically at $T_N=23$ K, and the magnetic structure consists of two sublattices of FeCl$_2$-chains lying along the c-axis. The coupling along the chains is ferromagnetic with weak antiferromagnetic coupling between chains. Application of an external magnetic field along the easy axis ($a$) induces phase transitions at $H_1=39$ kOe and at $H_2=46$ kOe.

We report the observation of the three phases using the Mössbauer effect in a single crystal of FeCl$_2$·2H$_2$O cut parallel to the c-axis and placed at 32° to the γ ray beam and magnetic field $H_0$ so that $H_0$ was parallel to the easy axis $a$. The results may be summarized as follows: (1) For $H_0<H_1$ we observe two superposed spectra with equal intensities due to the external field adding and subtracting to the hyperfine field in the spin down and spin up sublattices respectively; (2) For $H_1<H_0<H_2$ the relative intensities of the spin up to spin down spectra are roughly 3:1. (3) For $H_2<H_0$, only one spectrum is observed. These observations are consistent with the antiferromagnetic $\rightarrow$ ferrimagnetic $\rightarrow$ paramagnetic model of Narath from susceptibility measurements.

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**Supported by the Organization of American States.**

**Supported by the National Science Foundation.**