Magnetization and Hall effect measurements on the pyrochlore iridate Nd$_2$Ir$_2$O$_7$\textsuperscript{1} \textsc{steven disseler}, \textsc{sean gibli}, \textsc{chetan dhital}, \textsc{kevin lukas}, \textsc{stephen wilson}, \textsc{michael graf}, \textsc{boston college} — We present magnetization and Hall effect measurements on the pyrochlore iridate Nd$_2$Ir$_2$O$_7$. Previous muon spin rotation measurements have shown that the system undergoes an unusual transition at $T_M \sim 110$ K into a magnetic phase lacking long-range order, followed by a transition at $T_{LRO} \sim 6$ K into a state with long-range magnetic order. We observe a small remnant magnetization when cycling through zero magnetic field at temperatures below $T_M$. Below $T_{LRO}$ an additional hysteresis effect appears at a higher field $B_c = 2.8$ T, together with the appearance of non-monotonic and hysteretic Hall resistance with a maximum at $B_c$. The dependence on field sweep direction suggests a non-trivial transition in the magnetically ordered state similar to that of spin-ice systems. This work was supported in part by National Science Foundation Materials World Network grant DMR-0710525 and by NSF CAREER award DMR-1056625.

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