Block 7

Step 7 — MR requires a ferromagnet, but spin polarization does not.

As established in Block 6: the spontaneous spin texture $\langle s_m \rangle \propto \nabla_m$ exists even for $P_\chi = 0$, meaning an ordinary non-magnetic reservoir is sufficient to lock in the molecular spin configuration. The GMR magneto resistance, however, is defined as:

$$MR = [J(P_\chi) - J(-P_\chi)] / [J(P_\chi) + J(-P_\chi)]$$

which requires flipping P_χ — the magnetization a ferromagnetic electrode. Without the ferromagnet, $J(0) - J(0) = 0$ identically and no MR signal exists.

These are two distinct phenomena sharing the same root. The spontaneous spin ~~texture~~ polarization is the cause, the MR is a consequence that only becomes observable when you have a spin-sensitive probe. The ferromagnet acts as a detector, not as the source of the spin polarization.