

Abstract Submitted  
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**Earth's field NMR; a surface moisture detector?**<sup>1</sup> EIICHI FUKUSHIMA, STEPHEN ALTOBELLI, ANDREW MCDOWELL, TONGSHENG ZHANG, ABQMR — Earth's field NMR (EFNMR), being free of magnets, would be an ideal teaching medium as well as a mobile NMR technique except for its weak S/N. The common EFNMR apparatus uses a powerful prepolarization field to enhance the spin magnetization before the experiment. We introduce a coil design geared to larger but manageable samples with sufficient sensitivity without prepolarization to move EFNMR closer to routine use and to provide an inexpensive teaching tool. Our coil consists of parallel wires spread out on a plywood to form a current sheet with the current return wires separated so they will not influence the main part of the coil assembly. The sensitive region is a relatively thin region parallel to the coil and close to it. A single turn of the coil is wound to be topologically equivalent to a figure-8. The two crossing segments in the center of a figure-8 form two of the parallel wires of the flat coil. Thus, a two-turn figure-8 has four crossing wires so its topologically equivalent coil will have four parallel wires with currents in phase. Together with the excellent sensitivity, this coil offers outstanding interference rejection because of the figure-8 geometry. An example of such a coil has 328 parallel wires covering a  $\sim 1$  meter square plywood which yields a good NMR signal from 26 liters of water spread out roughly over the area of the coil in less than one minute in a nearby park.

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