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Temperature dependence of proton NMR relaxation times at earth's magnetic field[1] PETER NIEDBALSKI, ANDHIKA KISWANDHI, CHRISTOPHER PARISH, SARAH FERGUSON, EDUARDO CERVANTES, ANISHA OOMEN, ANAGHA KRISHNAN, AAYUSH GOYAL, LLOYD LUMATA, University of Texas at Dallas — The theoretical description of relaxation processes for protons, well established and experimentally verified at conventional nuclear magnetic resonance (NMR) fields, has remained untested at low fields despite significant advances in low field NMR technology. In this study, proton spin-lattice relaxation (T_1) times in pure water and water doped with varying concentrations of the paramagnetic agent copper chloride have been measured from 6 to 92^{o}C at earth's magnetic field (1700 Hz). Results show a linear increase of T_1 with temperature for each of the samples studied. Increasing the concentration of the copper chloride greatly reduced T_1 and reduced dependence on temperature. The consistency of the results with theory is an important confirmation of past results, while the ability of an ultra-low field NMR system to do contrast-enhanced magnetic resonance imaging (MRI) is promising for future applicability to low-cost medical imaging and chemical identification.

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