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Hyperpolarized water as an authentic magnetic resonance imaging contrast agent.[1] SONGI HAN, EVAN MCCARNEY, BRANDON ARMSTRONG, University of California Santa Barbara — Water itself in a highly 1H spin-polarized state is proposed as a contrast agent free contrast agent to visualize its macroscopic evolution in aqueous media by magnetic resonance imaging (MRI). Hyper-polarization suggests an ideal contrast mechanism to highlight the ubiquitous and specific function of water in physiology, biology and materials because the physiological, chemical and macroscopic function of water is not altered by the degree of magnetization. We present an approach that is capable of enhancing the 1H MRI signal by up to two orders of magnitude, instantaneously, under ambient conditions, at 0.35 Tesla, by utilizing highly electron spin-polarized nitroxide radicals that are covalently immobilized onto a porous, water-saturated, gel matrix. The continuous polarization of radical-free flowing water allowed us to distinctively visualize vortices in model reactors and dispersion patterns through porous media utilizing the remotely enhanced liquids to obtain unusually high image contrast (RELIC).

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