

Abstract Submitted
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All-optical patterning of Nuclear Polarization in Gallium Arsenide¹ YUNPU LI, JONATHAN P. KING, JEFFREY A. REIMER, CARLOS A. MERILES, None — We employ Stray-Field NMR Imaging for ^{69}Ga and ^{71}Ga to monitor the spatially-dependent polarization of nuclear spins in semi-insulating bulk GaAs at 9.4 T. By exploiting two competing mechanisms as hyperfine and quadrupolar interaction for optical nuclear polarization at different illumination intensities and wavelengths, we demonstrate all-optical creation of three-dimensional patterns of positive and negative nuclear polarization. We also observe the isotope dependence of the patterning process, where different isotopes (^{69}Ga and ^{71}Ga) have opposite polarization at the same location in the sample. By combining the optical pumping with varied NMR pulse sequences, we demonstrate the control of nuclear polarization.

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None

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