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Bulk Nuclear Hyperpolarization in Diamond MELANIE DRAKE, ERIC SCOTT, JONATHAN KING, JEFFREY REIMER, University of California - Berkeley — Optical pumping in diamonds containing a high density of nitrogen vacancy (NV) centers is shown to generate large bulk 13C spin polarization at high magnetic fields. The phenomenon occurs spontaneously and at room temperature. The sign and magnitude of the nuclear polarization is found to be sensitively dependent on crystal orientation and light polarization. We discuss possible mechanisms for the polarization transfer between the NV and nuclear spins, revisiting a previous model where the thermal contact between the NV ensemble dipolar energy reservoir and the nuclear Zeeman reservoir was used to explain the observed nuclear polarization.

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