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Recursive polarization of nuclear spins in diamond at arbitrary magnetic field DANIELA PAGLIERO, ABDELGHANI LARAOUI, JACOB HENSHAW, CARLOS MERILES, CUNY-City College of New York — We introduce an alternate route to dynamically polarize the nuclear spin host of nitrogen-vacancy (NV) centers in diamond. Our approach articulates optical, microwave and radio-frequency pulses to recursively transfer spin polarization from the NV electronic spin. Using two complementary variants of the same underlying principle, we demonstrate nitrogen nuclear spin initialization approaching 80% at room temperature both in ensemble and single NV centers. Unlike existing schemes, our approach does not rely on level anti-crossings and is thus applicable at arbitrary magnetic fields. This versatility should prove useful in applications ranging from nanoscale metrology to sensitivity-enhanced NMR.

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