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Progress towards room temperature quantum computation based on NV centers in diamond PETER MAURER, NICHOLAS CHISHOLM, GEORG KUCSKO[1], Harvard University, LIANG JIANG, CalTech, JERO MAZE, ALEXEY GORSHKOV, NORMAN YAO, DIRK ENGLUND, ALEXANDER ZIBROV , Harvard University, DANIEL TWITCHEN, Element Six Ltd, RONALD WALSWORTH, MIKHAIL LUKIN, Harvard University — We report on recent progress towards the implementation of fundamental building blocks of a room temperature quantum computer based on an array of nitrogen vacancy (NV) centers in diamond. We use the nitrogen nuclear spin as a quantum memory due to its long coherence time, and the electronic spin of the NV center for manipulation and efficient read out of the qubit [Jiang, Science]. Coupling between individual NV centers, separated by ∼20nm, is provided by magnetic dipole-dipole interaction. Individual addressing is accomplished via a combination of magnetic field gradients and far-field sub-wavelength optical manipulation. Techniques for parallel manipulation of multiple NV centers will be discussed.

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