Probing and controlling dimensionality of strongly interacting spin ensembles THOMAS MITTIGA, CHONG ZU, University of California, Berkeley, SIMON MEYNELL, University of California, Santa Barbara, BING-TIAN YE, FRANCISCO MACHADO, SATCHER HSIEH, PRABUDHYA BHATTACHARYYA, SOONWON CHOI, University of California, Berkeley, ANIA JAYICH, University of California, Santa Barbara, NORMAN YAO, University of California, Berkeley — Understanding the decoherence of a strongly interacting spin ensemble remains an important challenge at the interface of basic science and quantum technology. Here, we experimentally investigate the electronic spin coherence of nitrogen-vacancy (NV) centers in a nitrogen-14 enriched delta-doped diamond. In this sample, the average spin-spin spacing (~5 nm) is close to the thickness of the delta-doped layer, leading to a quasi-two dimensional spin system. Compared to conventional 3D samples, we observe an improvement of NV coherence times with a distinct temporal profile. We provide a theoretical model for the observed spin coherent dynamics as a function of dimension. Our work provides new opportunities for exploring novel non-equilibrium physics.