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**High-sensitivity single NV magnetometry by spin-to-charge state mapping** JEAN-CHRISTOPHE JASKULA, Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, Massachusetts 02138, USA, BRENDAN SHIELDS, ERIK BAUCH, MIKHAIL LUKIN, Department of Physics, Harvard University, Cambridge, Massachusetts 02138, USA, RONALD WALSWORTH, ALEXEI TRIFONOV, Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, Massachusetts 02138, USA — Nitrogen-Vacancy (NV) centers in diamond are atom-like quantum system in a solid state matrix whom its structure allows optical readout of the electronic spin. However, the optimal duration of optical readout is limited by a singlet state lifetime making single shot spin readout out of reach. On the other side, the NV center charge state readout can be extremely efficient (up to 99% fidelity) by using excitation at 594 nm. We will present a new method of spin readout utilizing a spin-depending photoionization process to map the electronic spin state of the NV onto the its charge state. Moreover, pre-selection on the charged state allows to minimize data acquisition time. This scheme improves single NV AC magnetometry by a factor of 5 and will benefit other single NV center experiments as well.

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