

Abstract Submitted
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Photocurrent measurement on donor bound excitons in Si NA YOUNG KIM¹, DARIN SLEITER, THADDEUS LADD², Stanford University, KATSUYA NOZAWA, Panasonic, Japan, YOSHIHISA YAMAMOTO³, Stanford University — Donor bound excitons are formed when free excitons are captured by neutral donor impurities. Due to the spatial localization of exciton at the impurity site, the decay process of donor bound exciton state to neutral donor state features extremely narrow linewidth in energy. Utilizing this inherent feature, it would be feasible to identify nuclear spin states of the donor impurity resulting from the hyperfine interaction between phosphorus nucleus spin and electron spin. We study ensembles of phosphorus donor bound excitons in Si via photocurrent measurements at low temperatures since Auger non-radiative decay process is primarily dominant in an indirect band-gap semiconductor such as Si. We report electric and magnetic field effects on photocurrent signals of phosphorus donor bound excitons.

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