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## Contact-free readout concept and recent progress toward single-electron resolution large-mass semiconductor detectors

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Semiconductor detectors, particularly those using CCD or Neganov-Trofimov-Luke (NTL) assisted phonon-mediated techniques are the technologies of choice for the experiments seeking rare and very low energy interactions such as low mass dark matter or coherent elastic neutrino nucleus scattering (CE $\nu$ NS). The ultimate sensitivity reach of the current detector design is hindered by a stochastic carrier leakage that seems to be primarily due to the particular detector contact architecture at use. We will present a new semiconductor bias and readout design wherein the bias electrodes do not have a physical contact with the substrate. We will present recent progress toward single-carrier excitation in large mass Si or Ge of  $\sim 100$  g using this novel design. We will also present the application of this novel technique for fast and non-pervasive prescreening of semiconductor crystals for defect and impurity concentration evaluation.

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