Quantum Dot TiO$_2$-Ge Solar Cells CARENA CHURCH, UC Santa Cruz, ELAYARAJA MUTHUSWAMY, SUSAN KAULZARICH, UC Davis, SUE CARTER, UC Santa Cruz — Colloidal germanium (Ge) quantum dots (CQDs) are attractive solar materials due to their low toxicity compared to Pb- or Cd-based nanocrystals (NC), low cost, and optimal, tunable bandgap for both increased IR response and potential power conversion efficiency ($\eta$) boosts from Multiple Exciton Generation (MEG). We report on the successful fabrication and characterization of spun-cast donor/acceptor type TiO$_2$-Ge CQD solar cells utilizing Ge colloidal quantum dots (CQD) synthesized via a facile microwave method as the active layer. We find that our Ge QD size performance-related trends are similar to other QD systems studied. Additionally, our best heterojunction devices achieved short circuit currents ($J_{SC}$) of 450 $\mu$A and open circuit voltages ($V_{OC}$) of 0.335 V, resulting in $\eta = 0.022\%$. While this represents significant increases over previous Ge CQD PV (85% over hybrid Ge-P3HT PV, 350% over Ge NC PV), our photocurrents are still much lower than other NC systems. Analysis of intensity-dependent J-V characteristics reveal that our currents are limited by a space-charge region that forms leading to unbalanced charge extraction. We conclude by discussing a variety of film treatments and device structures we have tested to increase $J_{SC}$.