This thesis is focused on a study of CdTe and CdZnTe semiconductor detectors working under high flux of radiation. We studied experimentally an influence of high flux of X-rays and optical radiation on polarization of the detector. The polarization phenomenon decreases the efficiency of the detector due to a screening of an applied electric field by a space charge accumulated at deep levels due to a trapping of photogenerated carriers. In order to measure the electric field profiles in the detectors we employed a method based on cross polarizers technique and Pockels effect. The main objective of this work was to study the possibilities of an optical de-polarization of CdTe and CdZnTe detectors for different photon energies of additional light, its dynamics and physical origin. We have found that detectors can be de-polarized by above bandgap light. Moreover, CdZnTe detector can be depolarized by near infrared light and in a pulse mode. The de-polarization is associated with a compensation of the space charge at deep traps.