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New Materials for Semiconductor Radiation Detectors

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The demand for new detector materials continues to develop, across a wide range of applications including X-ray and synchrotron imaging, neutron detection, and radiation hard tracking detectors. In this paper the current status of new materials for semiconductor detectors will be reviewed, with a particular emphasis on the requirements for imaging and pixellated devices. In the field of hard X-ray and gamma ray imaging there has been continued improvement in the quality of detector grade high-Z compound semiconductor materials such as CdTe and CdZnTe. The availability of these materials, whilst still limited, continues to develop. There has also been significant progress in the development of thick film polycrystalline materials such as CdTe, PbO and HgI2 for applications as large area detector layers, suitable for direct-deposition onto pixellated substrates. Single-crystal synthetic diamond is another material that has developed rapidly, with high purity diamond detectors now being developed for various applications in imaging, dosimetry and radiation hard tracking detectors. In this talk I will review these various candidate materials and discuss their application for the next generation of position sensitive detectors.

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