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Three-dimensional integration of sensors and electronics

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We discuss the current status and prospects for three-dimensional integration (3D) of sensors and electronics. 3D consists of a suite of technologies including through-silicon vias, wafer bonding and thinning, and fine pitch interconnection. These technologies have the potential to transform the capabilities of pixelated sensors in High Energy Physics providing finer pitch, more complex electronics, and heterogeneous integration. In the last 5 years 3D integration techniques have been widely adopted in the image sensor industry. However scientific applications are lagging. We will discuss experience with 3D sensors and electronics in HEP and technical and commercial roadblocks to adaptation. We will survey the availability of foundries that support the critical bonding and via technologies. Finally, we will discuss examples of possible applications of these technologies to future experiments.

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