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The Two 3Ds Combined: Tiles for Large Area Intelligent Arrays

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Future intelligent tracking systems are likely to require large area sensor modules with finely segmented, intelligent readout. However conventional module construction, with readout bonded at the periphery and significant sensor dead area, makes it difficult to build large area pixelated modules with good yield,low mass and small dead area. The combination of 3D active edge sensors and 3D (vertically integrated) electronics solves these problems by enabling the fabrication of readout chip/sensor tiles which can be butted on four sides and are readout through the top surface. We describe the concept for these "large area array" tiles and the design of active edge sensors and test modules currently being fabricated. We describe applications for the CMS Track Trigger as well as vertex detectors for future lepton colliders.

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