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Planar pixel detector module development for the HL-LHC ATLAS pixel system

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The ATLAS pixel detector for the HL-LHC will require the development of large area pixel modules that can withstand does up to 2x1016 neq cm-3. The area of the pixel system will be over 5m2 and as such low cost, large area modules are required. The development of a quad module based on 4 FE-I4 ROIC will be discussed. The FE-I4 ROIC is a large area chip and the yield of the flip-chip process on single chips and the quads is covered. The readout of the quad module for laboratory tests will be reported. To reduce mass of the system the assembly will be required to be as thin as possible and the insensitive edges of the sensors also need to be reduced to a minimum. The thin edge is achieved by reducing the physical edge of the sensor and by the use of through-silicon vias to move the wire bond pads from the edge of ROIC to its backside. Progresses in these areas are discussed.

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