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Study of efficiency and noise of fine pitch planar pixel detector for ATLAS ITk upgrade

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In the resent development of pixel detectors for the ATLAS Inner Tracking detector upgrade, thin planar pixle detector has been developed and ready for the production. A half size readout ASIC, RD53A, which supposed to be the last prototype before the pre-production chip is available. The RD53A chip compatible sensors are developed at KEK/HPK in Japan and flip-chiped modules are tested by testbeam before and after irradiation. To minimize the noise from the sensor surface structure, the optimization of the biasing network structure has been performed. The noise level highly depends on the resistivity of biasing network and the capacitance between biasing network and electrode. In this presentation, the efficiency measurement by testbeam and sensor surface structure optimization to reduce noise are presented.

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