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Test of a Fast Cluster Finding Self-Seeded Trigger System for the ATLAS Upgrade

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The ABCN 130 chip developed for the high luminosity LHC upgrade of the ATLAS silicon strip tracker implements a Fast Cluster Finder (FCF). The FCF is capable of reading out certain track cluster information serially with a clock rate up to 640 MHz, sufficient to output the location within the 40 MHz collision frequency. An external correlator circuit can be used to find the position coincidence of clusters at two adjacent layers of silicon sensor. The coincidence offset is related to the transverse momentum of the track, and therefore it provides information which may contribute to a Level-1 trigger decision. These circuit elements have been implemented in sensor doublet configuration coupled to an FPGA which executes the correlator algorithm. Design and test results of this system will be presented.

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