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Design and development of a micro-strip stacked module prototype to measure flying particles direction

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Experience at high luminosity hadron collider experiments shows that tracking information enhances the trigger rejection capabilities while retaining an high efficiency for interesting physics events.
The design of a tracking based trigger for SLHC is an extremely challenging task, and requires the measurement of the charged particle momentum at first level trigger. Simulation studies show that the measurement of the charged track momentum can be achieved by correlating hits on two closely spaced silicon strip sensors.
This work has been focussed on the design and development of micro-strip stacked module prototype and will discuss the technical challenges in the construction of modules made of two silicon micro-strip sensors stacked on top of the other and wire bonded to the same readout chip. Several possible sensor spacing and wire bond techniques will be presented.
The prototypes have been built with the silicon sensors and electronics used to equip the present CMS Tracker. Coincidences of signals collected from strips of top and bottom sensors are evaluated off detector.
We will present the tests performed on the prototype modules in terms of the noise performance of the proposed stack geometry and the full electric characterization and stability in time of the devices. Some preliminary results in terms of signal over noise and coincidence signal generation using cosmic rays will also be shown.

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