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A level-1 pixel based track trigger for the CMS upgrade (12' + 3')

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We present feasibility studies to investigate the performances and interest of a Level-1 trigger based on pixels. The Level-1 (real-time) pixel based tracking trigger is a novel trigger system that is based on the real-time track reconstruction algorithms able to cope with very high rates and high flux of data in a very harsh environment. The pixel detector has an especially crucial role in precisely identifying the primary vertex of the rare physics events from the large pile-up (PU) of events. The goal of adding the pixel information already at the real-time level of the selection is to help reducing the total level-1 trigger rate while keeping an high selection capability. This is quite an innovative and challenging objective for the experiments upgrade for the High Luminosity LHC (HL-LHC).

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