Abstract for an Invited Paper
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The Challenge of Triggering Collider Experiments[1]

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The data taken by a particle physics collider detector consists of events, which are snapshots of the detector data at specific intervals in time. Usually these snapshots are taken at the frequency of the crossing of the colliding beams. For HERA this was 96 ns, for the Tevatron Run II this was 396 ns and for the LHC this is 25 ns. An individual bunch crossing may contain either no, one or many interactions between the particles in the colliding beams. Not all of the detector data from an individual crossing is available immediately. The selection of bunch crossings by the detector trigger system is a highly complex function that involves a series of levels which take increasing amounts of time, process increasing amounts of data, use increasingly complex algorithms and make increasingly more precise determinations to reject increasing numbers of crossings. The first level(s) of the series usually involve(s) specific custom high-speed electronics. The subsequent level(s) involve more general CPU farms that run code similar to that found in the offline reconstruction. The trigger is the start of the physics event selection process. The challenges, development and evolution of collider detector trigger systems are described.

[2]Abstract for Invited Talk: Special session for the Sakurai, Panofsky and Primakoff awards winners