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(Invited) Medipix and Timepix: introducing young people to nuclear and particle physics

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Hybrid silicon pixel detectors were developed to meet the requirements of vertex detection at the LHC. Three of the four large experiments are equipped with pixel vertex trackers and the fourth will upgrade to one soon. Hybrid pixel detectors were chosen because they provide hit information tagged to a single LHC bunch crossing with an extremely high signal to noise ratio. This information helps greatly to decode the complex events at the LHC. The Medipix and Timepix detectors use the same technology and approach to particle detection but their aim is more general purpose in nature. The Medipix chips (1, 2 and 3) provide photon or particle counting with varying degrees of energy resolution and binning options. The Timepix chip provides arrival time (ToA) or Time-over-Threshold (ToT) information on a frame-by-frame basis while the most recent Timepix3 chip provides both ToA and ToT information simultaneously in a data driven mode. This presentation will review the chip family highlighting the strengths and limitations of its various members. Particular emphasis is placed on how these devices and their associated compact readout systems have lead to applications in schools, in space and for other educational purposes.

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