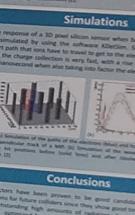


The increase of proton flux in the upper radiation detectors is further limited by the detector noise. In addition to the noise reduction, the detector must have good charge collection efficiency. The higher the proton flux, the higher the noise. This depends on the noise of the detector and the requirements.

3D silicon detectors

3D silicon detectors consist of one or more layers of silicon wafers. This architecture [1] allows the detector to have the capability to withstand high amounts of ionizing radiation without being damaged. Close to the electrodes, very efficient time resolution can be achieved.



The response of a 3D pixel silicon sensor when hit by a short path that has to travel through the detector. The short path collection is very fast, with a rise time of about 100 ps.

Simulations

3D detectors have been proven to be good candidates for radiation detectors, especially for high energy applications. They are optimized for timing and other parameters.

Conclusions

The simulations prove that 3D detectors are better than 2D detectors for future colliders since they have a better time resolution and other parameters.