Contribution ID: **208** Type: **Poster**

A novel method to estimate the impact parameter on a drift chamber cell by using the information of single ionization clusters.

Wednesday, 27 May 2015 09:14 (0 minutes)

Gaseous wire drift chambers are a common device for tracking charged particles to extract information on their momentum or type. A particle crossing a drift chamber cell produces several ionization clusters, but only the signal coming from the cluster which is closest to the anode wire is usually exploited to extract the impact parameter.
This introduces a bias, especially in tracking chambers where light gas mixtures are needed, where the number of ionization clusters is limited to $\sim$ 10/cm.
Measuring the time of each ionization cluster has been proposed in the past to improve the impact parameter reconstrucion, reducing the bias and the single hit resolution, and ad-hoc formulae have been developed to combine information on the single clusters.
We show that the problem of finding an estimator of the impact parameter can be solved with an algorithm called Maximum Possible Spacing (MPS), which provides a statistically optimal estimator in this case and, unlike the algorithms proposed to date, does not rely on the knowledge of specific parameters of the detector.
We will describe the MPS approach in comparison with other proposed algoritms, and show its application on simulations. The application of this method to a real situation is also discussed.

Primary author: SIGNORELLI, Giovanni (PI)

Co-authors: D'ONOFRIO, Adelina (PI); VENTURINI, Marco (PI)

Presenter: VENTURINI, Marco (PI)

Session Classification: Gas Detectors - Poster Session

Track Classification: S7 - Gas detectors