

RCNP NUCLEAR PHYSICS EXPERIMENT SEMINAR

- Title Technological horizons of sub-100ps timing with gaseous detectors
- Speaker Dr. Diego Gonzalez-Diaz
 (Uludag Univerisity/CERN)
- Date/Time Thursday 26th Jan 2017, 10:00 a.m.
- Place Lecture room 1, 6th floor, RCNP Main Building

Abstract:

Achieving an accurate time response through gaseous media is unavoidably linked to the use of high fields and small gas gaps. But... what are the technological implications of these facts? : high fields entail resistive protection whereas small gaps enforce operation either at high pressure, in multi-gap configuration or with auxiliary solid converters so as to maintain an efficient detector response. These requirements would seemingly confine gaseous timing detectors to operation under relatively low particle fluxes (to avoid charging up) as well as relatively small sizes (to keep the good timing characteristics).

In year 2000, 'multi-gap timing resistive plate chambers' (MtRPCs) were introduced and have been universally adopted since. MtRPCs are regularly used or studied in experiments and applications that require the detection on large areas of minimum ionizing particles, heavy ions, gamma rays or neutrons with sub-100ps accuracy. By simply 'stretching' the original concept outlined by Fonte, Smirnitsky and Williams, MtRPCs can be operated nowadays under a particle flux close to $100\text{kHz}/\text{cm}^2$, and assembled in m-square modules with a timing accuracy approaching 50ps (20ps in small detectors).

We will revisit in this talk the limits of the MtRPC technology towards the 10ps landmark, as well as discussing recent approaches and ideas.

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