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Investigations of Kr-Xe mixtures in gas avalanche detectors

Tuesday, 13 October 2015 16:00 (1 minute)

Recent investigations with a gaseous avalanche micropatterned detector operating in Kr-Xe mixtures will be presented. The use of such mixtures allows to keep a minimal position resolution over a wide X-ray energy range [1]. Measurements and simulations of the gain, energy and position resolution variation according to the Xenon mixture concentration will be presented. Our first results using a THCOBRA [2], measured and calculated, indicate a gain increase with the increase of Xe concentration. Calculation of the number of primary electrons and W value for such mixtures will be also presented.
The performance of the THCOBRA detector using different mixtures will be compared to the calculated results with a discussion of the possible deviations. Also, details on the gas purification system will be present.
The experimental results were obtained by using a 55Fe providing 5.96 keV photons while the calculations were performed by using Degrad software [3].
The detector, irradiated with an X-ray tube to produce image acquisition and its application on Computed Tomography applications will be discussed [4].
A discussion and results comparison with Kr and Xe pure will be presented.

[1] C. D. R. Azevedo et al., Phys. Lett. B, vol. 741, no. 0, pp. 272–275, 2015.
[2] A. L. M. Silva et al., NSS/MIC,IEEE, 2012, pp. 1160–1164
[3] S. Biagi, "Degrad."[Online]. Available: http://consult.cern.ch/writeup/magboltz/.
[4] L. F. N. D. Carramate et al., NSS/MIC, IEEE, 2012, pp. 3664–3666.

Primary author: Dr SILVA, A. L. M. (I3N –Department of Physics, University of Aveiro, Portugal)

Co-authors: Dr AZEVEDO, C. D. R. (I3N –Department of Physics, University of Aveiro, Portugal); Ms FORTES, Iolanda (I3N –Department of Physics, University of Aveiro, Portugal); Dr VELOSO, J. F. C. A. (I3N –Department of Physics, University of Aveiro, Portugal)

Presenter: Prof. VELOSO, João (University of Aveiro)

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