these satellites peaks would increase with the number of guard rings of the diode. Having in mind this perspective, we carried on some alpha spectra using a new silicon diode, manufactured at CERN, which enabled us to select from one to ten guard rings. Surprisingly, even when ten guard rings were connected to the ground, the relative intensity of these peaks were about 1% compared to the true peaks.
This behavior indicates that the true cause of these spurious satellites pulses might be not only associated with the weak electric fields around the guard ring region but also with changes on the entrance window absorption near the edge of the diodes. Further steps are needed to clear up this problem.

[02/09/03 - Poster]

Two-parameter analysis of the temporal behaviour of resistive detectors

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A computer program was developed to analyse the data acquired from cathode resistive detector by the data acquisition system **Gonk**. The output signal produced by these detectors decays with time due to the increase of the charge accumulated on the detector cathode which diminishes the effective high tension applied between detector-cathode and -anode. This decay depends on the glass material which is made the cathode and varies also with the measured count rate.
This acquisition system gets the data from the device driver and then builts and displays a two-dimensional matrix (energy × time histogram) representing the data.
The data was adjusted by least squares minimum method to a gaussian function whose centroid follows two exponential decay, as:

$$F(x,t) = \frac{A}{\sqrt{2\pi s^2}} e^{-\frac{1}{2}\left(\frac{x-x_c}{s}\right)^2} + d \tag{1}$$

where

$$x_c = x_c(t) = x_{c0} + a_1 e^{-b_1 t} + a_2 e^{-b_2 t} \tag{2}$$

is the centroid of the gaussian peak,

$$s = s(t) = s_{c0} + s_1 e^{-s_2 t} + s_3 e^{-s_4 t} \tag{3}$$

the standard deviation, and a_1, b_1, a_2, b_2, s_{c0}, s_1, s_2, s_3, and s_4 are parameters, d is a constant related to a possible flat background, A to counts, and x is position in the channel axis.
The results for a detector of 36.10 mm diameter, 1.16 thickness, $1.5\times10^{11}\ \Omega\ cm$, $k = 5(\rho\epsilon = 0.066s)$, 50μ diameter stainless stell anode, gas mixture P-10, 4 kHz count rate, ^{109}Cd radioactive source, and 120 s counting time are

$x_{c0} = 144(1)$ $A = 298(27) \times 10\ count \cdot s^{-1}$
$a_1 = 162(3)$ $a_2 = 37(3)$ $b_1 = 0.130(5)s^{-1}$ $b_2 = 0.021(3)s^{-1}$
$s_{c0} = 20.9(2)$ $s_1 = 15.6(14)$ $s_2 = 0.077(8)$
$\chi^2 = 0.72$

These values for b_1 and b_2 correspond to decay times of $7.7(30)s^{-1}$ and $48(7)s^{-1}$, respectively.

[02/09/03 - Poster]

Semi-empirical Compton Scattering Profile for Large Volume Germanium Detectors

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One of the main continuous component of the response function (RF) for germanium detectors is the Compton scattering occurring in the germanium crystal, due to the detection of gamma radiation. The other continuous components are the incomplete charge collection due to the escape of secondary electrons and the escape of bremsstrahlung photons. The description used for single Compton scattering in semi-empirical response function treatments shows a good agreement between experimental values and theoretical models[1-2]. On the other hand the multiple Compton scattering, double and triple, still presents some disagreement[2]. In some applications of the RF good precision and accuracy are needed, in order to determine, for example, the transition intensities and energies of photons lying in the Compton region (photon detection is represented by peaks in the spectrum). In addition,

calculation of the energy deposited in biological systems in order to obtain the absorbed dose(and kerma) needs an accurate RF that takes into account the effects related not only with the full absorption of photons(photoelectric effect) but the partial absorption (continuous components and the incomplete charge collection due to trapping and recombination of charge carriers) as well. Finally, to describe the multiple Compton scattering in germanium crystal, we performed an empirical approximation which shows a good agreement between the experimental spectra measured for two germanium detector crystals and the model proposed. The approximation was tested for a 50 cm^3 and 89 cm^3 coaxial germanium crystals and for energies ranging from 200 keV to 1.5 MeV. References [1]J.Y. Zevallos-Chávez, M.T.F. da Cruz, M.N. Martins, V.P. Likhachev, C.B.Zamboni, S.P.Camargo, F.A.Genezini, J.A.Medeiros, M.M.Hindi,Nucl. Instr. and Meth. A457(2001)212-219 [2]C. Lee Myung, K. Verguese, R.P. Gardner, Nucl. Instr. and Meth. A262(1987) 430

[02/09/03 - Poster]

Routing Interface for Multidetector Angular Correlation Spectrometer

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A routing interface has been built for simultaneous acquisition of four gamma–gamma coincidence spectra. The routing interface will be used in conjunction with a multichannel analyzer having four multiplexed inputs (Ortec EtherNIM model 919) coupled to the angular correlation spectrometer consisting of five germanium detectors. In this system one of the detectors (A) is used to detect a given gamma ray (γ_1) and the other four detectors (b, c, d, e), placed at different angles with respect to (A), register gamma spectra in coincidence with (γ_1) allowing for simultaneous measurement of several gamma–gamma directional correlations. The angular correlation spectrometer will be used, in our laboratory, for the nuclear structure study following the radioactive decay. The new interface will allow a considerable reduction in the experimental data acquisition time and an improvement in the precision of the final results at a smaller cost than that of the standard CAMAC system used in other laboratories.
The performance of the routing interface was evaluated through several test measurements, which included acquisition of gamma–gamma coincidence spectra using standard radioactive sources like ^{60}Co and ^{152}Eu, energy resolution and linearity of the system. The results of these tests are discussed. The test experiments demonstrate correct and efficient performance of the constructed interface.

[02/09/03 - Poster]

Development an calibration of a flux gas counter for application in conversion eletron Mö ssbauer spectroscopy

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Conversion electron Mössbauer spectroscopy (CEMS) has been used as a standard technique in various fields of Physics, Materials Science and Physical Chemistry since details for the construction of appropriate gas counters were reported. Recently, many works have appeared on the application of CEMS but a simple description of the methodology of detection is lacking. In this work the methodological aspects of this technique are discussed in basis of the construction and calibration of a standard gas counter detector. When a nucleus jumps to an excited state, it can revert to the ground state either by a radioactive process involving the emission of a fluorescent photon or by a radiationless transition also knows as internal conversion. In the latter process the excited nucleus interacts with a core electron, thereby maintaining the laws of momentum and energy conservation. The energy of the excited state, E_e, is partly used to unbind the core electrons, E_b, the rest providing this electron with a kinetic energy, E_k (E_k=E_e-E_b). After internal conversion the atom remains with a hole in a core level and there are many different ways by which the ground state may be achieved. Although the appropriate synchronization of source velocity and the detection of backscattered photons from the sample (fluorescent of 14,4 keV and K_α X-ray emitted after K-conversion in ^{57}Fe) allow resonance to be traced, and the detection of scattered electrons is a superior technique in cases where the outer part of the sample is to be studied. However, it is still necessary to examine the several aspects of system of detection involved in this technique.