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,