*[02/09/03 - Poster]*

**Effects of missing levelson a correlated spectrum**

M. P. Pato, Oriol Bohigas

It is shown that all spectral statistical measures of an incomplete sequence can be expressed in terms of the measures of the perfect spectrum. The exactness of the general formalism are illustrated by its application to the matrix eigenvalues of the Gaussian Orthogonal ensemble of the random matrix Theory. It is shown that a family of spectra can be obtained by dropping levels from a given spectrum, which is parametrized by the fraction of levels removed. The main result is the proof that the correlations of the incomplete spectrum have the same form of the correlations of the complete sequence with only a rescaling of variables. This result is particularly imporatant in the case of the two=point cluster function since it allows the calculation of all long-range statistical measures. One important consequence of the theory is the possibilty of infering all the properties of a sequence from a random sample of events. The results are applied to the analysis of nuclear data. It is shown that all spectral statistical measures of an incomplete sequence can be expressed in terms of the measures of the perfect spectrum. The exactness of the general formalism are illustrated by its application to the matrix eigenvalues of the Gaussian Orthogonal ensemble of the random matrix Theory. It is shown that a family of spectra can be obtained by dropping levels from a given spectrum, which is parametrized by the fraction of levels removed.

*[02/09/03 - Poster]*

**MONTE CARLO SIMULATION OF ACTIVITY MEASUREMENTS BY MEANS OF $4\pi\beta$-$\gamma$ COINCIDENCE SYSTEM**

Mauro Noriaki Takeda, Mauro da Silva Dias, Marina Fallone Koskinas

This work describes the methodology developed by the Nuclear Metrology Laboratory (LMN) from IPEN, in São Paulo, Brazil, for simulating all detection processes in a $4\pi(\beta,X)$-$\gamma$ coincidence system by means of the Monte Carlo technique. In this way, it is possible to predict the behavior of the observed activity as a function of the a $4\pi\beta$ detector efficiency.

In this approach, the information contained in the decay scheme is used for determining the contribution of all radiation emitted by the selected radionuclide, to the measured spectra of each detector. This simulation yields the shape of the coincidence spectrum, allowing the choice of suitable gamma-ray windows for which the activity can be obtained with maximum accuracy. Therefore, this simulation shall be able to predict a detailed description of the extrapolation curve, mainly in the region where the a $4\pi(\beta,X)$ efficiency approaches 100%, which is experimentally unreachable due to self absorption of low energy electrons in the radioactive source substrate

The theoretical work is being developed with MCNP Monte Carlo code, applied to a gas-flow proportional counter of a $4\pi$ geometry, coupled to a pair of NaI(Tl) crystals. The calculated efficiencies are compared to experimental values obtained at the LMN of IPEN. The extrapolation curve will be obtained by means of another Monte Carlo algorithm, being developed in the present work, to take into account fundamental characteristics of a complex decay scheme, including different types of radiation and transitions. The present paper shows preliminary calculated values obtained by the simulation and compared to experimental results.

*[02/09/03 - Poster]*

**Desorption of caesium in LRd soil**

Ana Luiza Astrath, Carlos Roberto Appoloni

This work consists of studying the $^{137}Cs$ it is adsorved of the soil through the movement of the water of the rain. Situation will be simulated similar to the one of rain in soil samples and this way to discover the basic hypothesis of the methodology of deposition measure and erosion of the soil for the method of the $^{137}Cs$, that consists of the idea that the cesium doesn't go out of the clay with the movement of the water of the rain, where if once the change was detected in the concentration of cesium, this is owed to the soil displacement (that is to say, of the clay together with the other phases of the soil). It will be discovered desorption of $^{137}Cs$ of the soil it is also happened in two different cases, and in one of them the soil samples will be percoled with a mixture of water and 1N $NH_4Cl$ and in other the soil samples will be percoled with a mixture of water and 0,5 M of acetate of ammonium + 0,02 M of EDTA. The measures were carried out by gamma spectrometry, using -if a detector of GeHP of efficiency of 10%, coupled to an electronics nuclear pattern and a plate multichannel of 8192 channels. The acquisition of the data was accomplished with the software MaestroTM, version 3.2. The resolution in energy for the line of 661.62 KeV the $^{137}Cs$ was of 1.5 KeV. Of the obtained results, it can be concluded that there was not desorption of cesium in the percolation just done with the water deionized. Already in the case of the samples negotiated with more addictive water the adsorved of $^{137}Cs$ of the samples of soils it can be observed, being of 57% when agreement with more water 1N $NH_4Cl$ and of 38% when agreement with more water 0,5 M of acetate of ammonium + 0,02 M of EDTA.