ray strength functions, and fission barriers. Basic calculations and graphical comparisons of parameters are also available.
(3) Update of X- and gamma-ray decay data standards for detector calibration and other applications. Recommended half-lives and absolute photon emission probabilities have been derived through the evaluation of a selected set of over 60 radionuclides deemed suitable for detector efficiency calibrations (X-rays from 5 to 90 keV, and gamma rays from 30 to 3000 keV); prompt emissions up to 14 MeV from specific (n,gamma) and (p,gamma) reactions were also considered, along with the gamma-gamma angular coincidence method and a consideration of the requirements to derive statistical correlations for measured decay data. An appropriate set of suitable X- and gamma-ray standards have been produced, with the expectation that these recommended values will be recognized as reference standards.
These data sets are in the process of being assembled into user-friendly databases. Their contents are described, along with other on-going data development activities.

[05/09/03 - Room 2]

Search for hidden chambers in the Mexican Sun Pyramid, at Teotihuacan, using a muon detector.

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An attempt is being made to solve the mystery of antique pyramids by applying the Alvarez muon detection technique to the Mexican Pyramid of the Sun at Teotihuacan. In spite of its fame, little is known about this, the largest pyramid in America, or even about the people who built it 20 centuries ago. Early excavations showed no identifiable internal structures of the which are a relatively common feature of other prehispanic monuments in Mesoamerica. Then, what was the purpose of building such a large structure? was it just a ceremonial monument? or could it be a mausoleum having the remains of an important personality?
A revealing discovery made in the early 1970's (shortly after Alvarez experiment) was the existence of a tunnel running 8 meters under the Sun Pyramid, ending near its symmetry axis. This finding represents the unique advantage of providing a site to install an atmospheric-muon detector to search for possible ($> 1m^3$) cavities in the body of the pyramid. Our purpose here is to describe the current status of such a project. Although the basic ideas behind this experiment are not far from those of Luis Alvarez and his team, there are important differences between the monuments at Teotihuacan and Giza, concerning the monument shape, size, and building materials. Thus here we report on new estimates and simulation work has been undertaken to determine the detector design changes required to carry out this experiment in Teotihuacan.

[05/09/03 - Room 2]

DEVELOPMENT OF MCMC/MCEF CODES FOR SPALLATION REACTION STUDIES AND ITS UTILIZATION FOR ADS (ACCELERATOR DRIVEN SYSTEM) STUDIES

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Nuclear Physics had allowed progresses in many academic areas, like atomic nucleus and nuclear reactions, but also enables important applications of nuclear energy in our modern way of life. We can point out those ones related to power generation from nuclear reactors, providing an almost inexhaustive power source due to the huge quantities of nuclear fuel existent in our planet, which guaranties its utilization for thousands of years. The main interest is the so-called Hybrid Reactors (ADS - Accelerator Driven System), in which the reactor has a sub critical core and the chain reaction is sustained by an external source that comes from spallation reactions induced by high energy protons (about 1 GeV) from an accelerator, producing a large number of secondary particles (mainly neutrons). For those applications, precise knowledge about nuclear structure and nuclear reaction characteristics are needed. Recently, the research groups from IFUSP and CBPF made a common effort to develop a computer program to calculate the intranuclear cascade proprieties and the nuclear evaporation process (MCMC/MCEF), present in all nuclear reactions with energies above few tens of MeV, using Monte Carlo techniques. Some reaction channels were included in those programs, resulting more realistic representation of the processes involved, aiming Reactor Physics studies and also academic studies about hadrons and mesons properties in nuclear way. The program has shown to be very useful to describe actinide and pre-actinide nuclear photofission reactions, demonstrating that the relevant processes that occur during the nuclear reaction are correctly calculated. In this work we will present some results obtained with this code and the comparison with experimental data.