

**National Institute for Physics and Nuclear Engineering (IFIN-HH)**  
**Hadron Physics Department**  
(<http://niham.nipne.ro>)

#### **A. Studies of exotic nuclear structure and dynamics near to the drip lines**

Description of coexistence exotic phenomena using variational procedures with projections on symmetries before variation based on realistic effective interactions in large model space

1. Studies of the effect of shapes and isospin mixtures and of pairing correlations in different channels  
on the structure and dynamics of the nuclei close to  $N=Z$  line. Beyond standard model through the investigation of super allowed Fermi beta decay and neutrino less double beta decay
2. Beta decay studies related to the nucleosynthesis of medium mass nuclei via the rapid proton burning relevant for X-ray bursts in astrophysics
3. Studies of nuclear structure and dynamics of neutron rich nuclei in  $A \sim 100$  mass region relevant for the rapid neutron capture astrophysics process

**Prof. Dr. Alexandrina Nicoletta Petrovici**

#### **B. Studies of collective type phenomena and Equation of State of strongly interaction matter**

1. Studies of collective type phenomena in  $p+p$  interactions at 7 TeV center of mass energy.  
Analysis of experimental data obtained using ALICE Experiment at LHC CERN
2. Search for experimental observables to be used in selecting soft processes in  $p-p$  and  $Pb-Pb$  interactions at LHC energies

**Prof. Dr. Mihai Petrovici, CSI Dr. Amalia Pop, CSIII Dr. Cristian Andrei, CSIII Dr. Andrei Herghelegiu**

#### **C. Development of a new generation of detectors for high counting rate future experiments (CBM at FAIR)**

1. Development of Resistive Plate Counters (RPC) used for charged particle identification based on time-of-flight method in relativistic and ultrarelativistic energies experiments
2. Development of transition radiation detectors (TRD) for electron-pion discrimination and tracking for high counting rate experiments

**Prof. Dr. Mihai Petrovici, CSII Dr. Alexandru Bercuci, CSII Dr. Mariana Petris**

#### **D. Design and tests of frontend electronics and data processing systems**

1. CADENCE design of frontend electronics associated to the detection and identification systems developed in Hadron Physics Department
2. Design of motherboards in SMD technology, interfacing the front end electronics with the detectors and data acquisition systems
3. Tests of the frontend electronics and their performance

**CSII Dr. Ing. Catanescu Vasile, CSII Dr. Gheorghe Caragheorgheopol**

#### **E. GRID type computing structures**

1. GRID type structures and their efficient operation. NIHAM within ALICE GRID
2. Setting-up the structure of an integrated system for monitoring and protection of the distributed computing structure NIHAM. Implementation and operation.

**Fiz. Claudiu Schiaua**

#### **F. Data acquisition and processing systems**

**Prof. Dr. Mihai Petrovici, CSII Dr. Alexandru Bercuci, Fiz. Claudiu Schiaua**

#### **G. Design of electronic interfaces**

**Ing. Gheorghe Caragheorgheopol**

#### **H. Simulations of TRD and RPC detectors**

**Fiz. Daniel Bartos**