Institut national de physique nucléaire et de physique des particules

COLLABORATION AGREEMENT

IN2P3 - COPIN

I. Identification of the laboratories	
Partner	COPIN
IN2P3 laboratories	**IJCLab**
Partner laboratories	IFJ PAN

II. Identification of the collaboration	
Title of the collaboration	Collective properties of exotic nuclei studied at ALTO and CCB with PARIS Demonstrator
Number of the collaboration	06-126
IN2P3 spokesperson	J. WILSON
COPIN spokesperson	M. KMIECIK
Scientific Domain	Nuclear Physics

Status of the collaboration	
Status	The renewal of the collaboration is requested for the period January 1st - December 31st, 2023

III. Status report for the period January 1st to December 31st, 2022

III.1 IN2P3 scientists in COPIN	
Total time approved for 2022	28
Total time used for 2022	10
List of scientists	1. J. WILSON (10 days)

III.2 COPIN scientists in France	
Total time approved for 2022	28
Total time used for 2022	27
List of scientists	1. B. SOWICKI (6 days) 2. A. MAJ (7 days) 3. M. KMIECIK (7 days) 4. M. CIEMALA (7 days)

III.3 Scientific results of the above-mentioned collaboration	
Description	

In 2022, construction of the first phase of the nu-Ball2 spectrometer was carried out at the ALTO facility. In parallel preparations have been undertaken to be ready for the nu-Ball2/PARIS configuration in the second half of 2022. The design work to couple the two spectrometers was carried out at IJC Lab, while the fabrication of the mechanical support structures was carried out at IFJ PAN, Krakow. The equipment will be transported from Krakow in October 2022, while the PARIS array was transported from GANIL in late September.

In the meantime, analysis of data taken at CCB and ALTO has been ongoing with the goal of submitting a future publication on the results, particularly for the experiment on GDR feeding of isomeric states in Platinum isotopes, a previous experiment, carried out at ALTO in Orsay.

In August 2022 physicists from Orsay and Krakow participated in the Zakopane Conference on Nuclear Physics “Extremes of the Nuclear Landscape” ,. Two invited talks were given:

M. Ciemala et al., Feeding of the isomers of different deformations via GDR gamma decay studied with nuBall + PARIS

J.N. Wilson et al., Gamma-ray spectroscopy of nuclear fission

In 2022 previous results from an experiment on the Isoscalar Giant Quadrupole Resonace in 208Pb studied by inelastic proton scattering at CCB, Krakow were published:

B. Wasilewska et al., Phys. Rev. C 105, 014310 (2022)

IV. Renewal of the collaboration for 2023

IV.1 Proposed scientific program

Description

For the remainder of 2022 and the year 2023 there will be very intense efforts of the collaboration to perform a number of experiments approved at the ALTO facility of IJC Lab using the nu-Ball2 array coupled to the full PARIS demonstrator (8 clusters). The approved experiments with nu-Ball2/PARIS are:

G. Pasqualato (ALTO/IJC Lab) – Evidence for enhanced collectivity in 58Fe examined through Coulomb excitation

J.N. Wilson (ALTO/IJC Lab) - Detailed spectroscopy of fission isomers in uranium isotopes

M. Ciemala (IJC Krakow) - Links between 80Sr compound nucleus’ shape and its residue’s deformation studied with the GDR

P. Napiorkowski (HIL Warsaw) - Coulomb excitation of the super-deformed band in 40Ca

M. Lebois (ALTO/IJC Lab) - n-Ball2/FROZEN: Neutron-gamma de-excitation of fission fragments and Level lifetimes in exotic neutron-rich nuclei

M. Matejska-Minda - Investigation of high spin structures in 44Ti and 42Ca via discrete and continuum gamma spectroscopy using nuBall2, PARIS and OPSA setup

The second of these experiments will be the thesis experiment of C. Hiver. Due to the significant number of experiments that will be run involving Polish and French scientists we therefore request a larger number of days than usual for trips for scientists from Polish institutions to France.

IV.2 Estimated duration for IN2P3 scientists in COPIN	
Total time requested for 2023	28
List of scientists	1. C. HIVER (7 days) 2. I. MATEA (7 days) 3. J. WILSON (7 days) 4. G. PASQUALATO (7 days)
IV.3 Estimated duration for COPIN scientists in France	
Total time requested for 2023	42
List of scientists	1. M. KMIECIK (7 days) 2. A. MAJ (7 days) 3. M. CIEMALA (7 days) 4. M. MATEJSKA-MINDA (7 days) 5. P. NAPIOROWSKI (7 days) 6. K. HADYNSKA-KLEK (7 days)

Comment Validation	
Unity Director	Fadi IBRAHIM (IJCLab) - 2022-10-13 17:17:46