GOURCHAND MANNA

I. **Name:** **Gourchand Manna**
Gender: **Male**
Date of writing the CV: 30.10.2023

II. **Date & Place of birth:** **04.03.1992,Bhupatinagar,Purba Medinipur, W.B., India**
Citizenship: **Indian**
Contact details: **Mobile: +919593970766**
E-mail: gourchand1993@gmail.com

State Aided College Teacher
Department Of Physics
Mugberia Gangadhar Mahavidyalaya
West Bengal, 721425

Visiting Research Fellow
Department Of Physics
Presidency University
86/1, College Street
West Bengal, 700073

III. Education and degree awarded

Degree	University/Institution	Year
Master of Science	**Guru Ghasidas Vishwavidyalaya, C.G, India**	**2016**
Bachelor of Science	**Vidyasagar University ,W. B, India**	**2013**

- **GATE Qualified.**
- **M.Sc Project**: " **Large Scale Shell Model Calculation of Neutron Deficient Ag Isotopes"** under the Guidance of **Dr T. Trivedi (Associate Professor, University of Allahabad).**

Summary of Research Work:

The advent of present day accelerators and detection technique enable us to make in-depth study of nuclear reaction mechanism, and also possible to observe nuclear structure at extreme condition. The nuclei near the shell closure have spherically symmetric shape which means that it appears identical when it is viewed from any direction and no point of reference exists by which the change in position can be identified. Thus, rotation cannot be defined for spherical nuclei which results exhibition of shell model states in their excitation spectra. In case of deformed nuclei, situated away from

shell closure region, the nuclear shape can be either prolate or oblate (axially symmetric shape). The deformation can be without axial symmetry resulting in different elongations along the three axes of the system, referred to as triaxial shape. The structure of the weakly deformed nuclei shows complex irregular pattern at low excitation energy dominated by single and quasiparticle excitation which can be explained by shell model calculation, on the other hand in the higher excitation energy domain, they exhibit different kinds of excitation modes. In this high excitation energy nuclear shape evolution from spherical to prolate, oblate or triaxial may occur. This shape evolution results in different types of phenomena i.e. superdeformation, smoothly terminating bands, shears mechanism and chiral rotation exhibited in excitation mechanism of the system. The nuclei in mass A ~ 140 region, exhibit irregular excitation at lower energies whereas band-like structures have been observed at higher excitation energy domain, are the excellent candidate to exhibit these exotic mode of excitation. Thus, these nuclei are subject of spectroscopic investigation over the decades and have been studied extensively both theoretically and experimentally. Indeed, magnetic rotational bands which are the consequence of shears mechanism have been observed in ^{139}Sm, ^{142}Gd and ^{141}Eu nuclei. In this mass region, several rotational bands based on triaxial deformed shape have been observed in $^{142\text{-}144}$Eu, $^{138\text{-}140}$Nd and $^{142\text{-}144}$Gd.

My research work evolved to investigate the aforesaid excitation mechanism for generation of angular momentum states in weakly deformed nuclei in mass A ~ 140 region using the γ - ray spectroscopic techniques at different accelerator centre's with the state of art large gamma detectors arrays. One of the main motivation of the research work is to investigate whether Shears Mechanism (Magnetic and Antimagnetic Rotation) is a general phenomenon of generating angular momentum in atomic nuclei near shell closure or not. Lifetime measurement of the excited states of interest plays one of the key roles of the investigation. Different techniques, such as Doppler Shift Attenuation Method (DSAM), have been applied to measure the precise level lifetime. The spin and parity of the states has been assigned and/or reconfirmed from DCO ratio, ADO ratio and polarization measurements. The research investigations related to the nuclear structure physics and the level lifetime measurements can be summarized as,

Collaborative work

I have actively participated / collaborated in several experiment. They are as follows

- Participated in the experiment titled "**Search for extreme excitation in ^{141}Sm and ^{141}Pm**" at **TIFR** Mumbai, Under the instruction of **Dr. S. Rajbanshi** (Presidency University, Kolkata).
- Participated in the experiment titled "**OBSERVATION OF POSSIBLE WOBBLING PHENOMENON IN 119I**" at **TIFR**, Mumbai, under the instruction of **Dr. Somnath Nag** (IIT BHU).

XI. School/Conference/Workshop Attended

- Attended and presented poster Titled **"Evidence of Antimagnetic Rotation in ^{141}Sm** "in **66th DAE Symposium** on Nuclear Physics at Cotton University , Guwahati, India (2022).
- Participated in the "**School on Data Acquisition and Analysis**" conducted by **Data Acquisition Group**, Inter University Accelerator Center (**IUAC**), **New Delhi**, during February 22-24, 2023.

Participated in the two day **DAE-BRNS** Symposium on **Nuclear Reaction and Structure up to Intermediate energy Collision (NRSIC-23)**, during January 24-25, 2023. **Variable Energy Cyclotron Centre(VECC)**, Kolkata

XIII. Names and contact details of reference

- **Dr. Subhendu Rajbanshi, Assistant Professor (Email: subhphy@gmail.com)**

  Department of Physics
  Presidency University, Kolkata, 700073, India

- **Dr. Gopal Mukherjee, Scientific Officer F**

  (Email: gopal@vecc.gov.in)

  Physics Group
  Variable Energy Cyclotron Centre, Kolkata – 700064, India.

- **Dr. Rudrajyoti Palit** , **Professor (H)** Email: **palit@tifr.res.in**

  Department of Nuclear and Atomic Physics,
  TIFR, Mumbai, India.