Syed Rehan Ali Naqvi

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Education

- **Unviersity of Catania** — Catania, Italy
  Erasmus Mundus MSc Nuclear Physics S4 — *Feb 2024 – July 2024*
- **Unviersity of Caen** — Caen, France
  Erasmus Mundus MSc Nuclear Physics S3 — *Sep 2023 – Jan 2024*
- **Unviersity of Sevilla** — Sevilla, Spain
  Erasmus Mundus MSc Nuclear Physics S1, S2 — *Oct 2022 – June 2023*
- **COMSATS University** — Islamabad, Pakistan
  Bachelor of Science in Physics — *Feb 2017 – Sep 2021*

Research Experience

- **Axions in Dense Quark Matter** — Unviersity of Catania
  Master Thesis under the supervision of Prof. Marco Ruggieri — *Feb 2024 – July 2024*
  - Investigated the effective action of QCD axions in dense quark matter.
  - Explored axion interactions in color-superconducting phases, symmetry breaking, and potential applications to compact stellar objects such as axion capture and neutron star cooling.
  - Calculated axion mass, topological susceptibility, and self-coupling in various superconducting phases.
- **The Diffusion of Pulsars in the $P - \dot{P}$ Diagram** — University of Caen
  M2 internship student under Dr. Marco Antonelli — *Sep 2023 – Jan 2024*
  - Focused on pulsar evolution and diffusion in the $P - \dot{P}$ diagram, by analyzing the stochastic models of timing noise by developing Python routines.
  - Obtained analytical and numerical Power Spectral Densities (PSDs) that can be contrasted to future long-baseline timing noise observations.
- **Generic Polynomial Inflationary Potentials and Cosmological Perturbations** — COMSATS University
  Bachelor Thesis under Dr. Muhammad Moosa — *June 2020 – August 2021*
  - Studied hybrid inflation models with chaotic polynomial potentials under slow-roll approximation.
  - Addressed plausibility of the model with Planck data bounds by incorporating fermionic radiative corrections.
  - The obtained scalar and tensor perturbations set the stage for the formation of large-scale structures after inflation ends.

Projects

- **ROOT analysis of Halo Nuclei:** Analysed the experimental data through ROOT for elastic and inelastic cross sections of ^{11}Li to understand the breakup channels.
- **Stellar Classification:** Prediction of star type by using feature correlation analysis through Machine Learning.
- **Conway's Game of Life and Variants:** Simulated cellular automaton and studied its relevance with complex systems and emergence.

Work Experience

- **Generations Now** — California, USA
  Automation Expert (Remote) — *Aug 2024 – Present*
  - **Duties included:** Development of workflows, API integrations, Meta and Google Ads.
- **Profit for Contractors** — Ottawa, Canada
  Processor Developer — *Aug 2022 – Dec 2023*
  - **Duties included:** Automation of workflows, integrated CRM sytems, and operation optimisation.
- **Wizenoze** — Amsterdam, Netherlands
  Physics Curriculum Curator — *Jan 2022 – Dec 2022*

- **Duties included:** Analysing global physics curricula, preparing educational content and improving student engagement.

- **Spectra Magazine** Lahore, Pakistan
  Writer and Editor *Dec 2018 – Sep 2020*
  - **Duties included:** Writing articles related to physics and mathematics to enhance public understanding of Science in Pakistan.

Skills

- **Programming Languages**: Python, C++, Mathematica, Cypher (GQL), HTML, CSS
- **Technologies**: Microsoft Office, Zapier, Git, Linux, ROOT

References

Prof. Marco Ruggieri
Professor of Physics
University of Catania
marco.ruggieri@dfa.unict.it

Dr. Marco Antonelli
CNRS Researcher
LPC Caen
antonelli@lpccaen.in2p3.fr