Calandriello Gennaro

g.calandriello@studenti.unipi.it | github.com/GennaroCalandriello | +39 3427563788

Education

University of Pisa *Pisa, Italy*

M.Sc. in Theoretical Physics *October 2018 - March 2024*

- **Research Thesis:** Anderson Localization in Lattice QCD in a Strong Background Magnetic Field
- **Relevant Courses:** General Relativity, Theories of Gravitation, Non-Perturbative QFT, Cosmology, Complex Systems, Numerical Methods for Theoretical Physics, Physics of Fundamental Interactions
- **Final grade:** 107/110

University of Salerno *Salerno, Italy*

B.S. Degree in Physics *September 2014 - September 2018*

- **Thesis:** Hydrogen Atom in Parabolic Coordinates: Symmetries and Conservation Laws
- **Relevant Courses:** Quantum Mechanics, Solid State Physics.
- **Final grade:** 102/110

Pomponio Leto *Teggiano, Italy*

Scientific High School Diploma

- **Fnal grade:** 100/100 e lode

Academic Projects

Complex Systems:

- **Quantum Chaos Investigation in Partial Differential Schrödinger Equation in presence of certain potentials. [GitHub]**
  Keywords: PDE, Random Matrix Theory, Spectral Decomposition, time dependent SH, time independent SE, quantum billiards, eigenvalues statistics.

Numerical Methods for Theoretical Physics:

- **Simulation of the 2D Ising Model with MCMC (Monte Carlo Markov Chain). [GitHub]**
  Keywords: Monte Carlo Methods, Metropolis-Hastings, Probability Distributions, Error Analysis, Bootstrap, Finite Size Scaling.
- **Simulation of a particle on a circle with PIMC (Path Integral Monte Carlo). [GitHub]**
  Keywords: Monte Carlo Methods, Metropolis, Path-Integral, Autocorrelation Functions, Topological Charge, Thermodynamics.
- **Simulation of PDE (Partial Differential Equations) with FDM (Finite Difference Methods). [GitHub]**
  Keywords: Euler, FTCS, ADI, Crank-Nicolson, Fokker-Planck.

Recent Highlights in Dark Matter:

- **Primordial Black Holes as a Dark Matter candidate, analysis of the gravity-Higgs non-minimally coupled potential through Renormalization Group Equation. [GitHub]**
  Keywords: PBHs, RGE, beta-functions, Standard Model, Hakwing Radiation, Generalized Uncertainty Principle.

Lattice Gauge Theories:

- **Simulations and analysis of SU(2) and SU(3) Yang-Mills theories. [GitHub]**
  Keywords: C++, SU(2), SU(3), Lattice Gauge Theories, Monte Carlo methods, Heat-bath, Metropolis, Over-relaxation, Higgs, Polyakov loop, Static quark-antiquark potential.
- **Simulation of a Higgs field coupled with SU(2) Yang-Mills. [GitHub]**
  Keywords: Monte Carlo Methods, Higgs, SU(2).

Skills

Programming	Python (NumPy, Matplotlib, Pandas, SciPy, SimPy, PyTorch, Scikit-learn, TensorFlow, etc.), C++, Vyper, Solidity
Miscellaneous	Linux, Shell (Bash), LaTeX, Markdown, Microsoft Office, Git, CUDA
Soft Skills	Problem-solving, Time Management, Teamwork.

Interests

Neural Networks	Gauge Equivariant Flow-Based Neural Networks architecture to sample configurations from a certain probability distribution through the spectral flow on SU(3) matrices.
Web3/BlockChain	Working in a team of currently 2 people developing an Ethereum Full Node, part of Ethereum architectures to maintain the state of the network and contribute to security and decentralization.
Classical Piano	Classical piano music student at Accademia di Musica Stefano Strata, Pisa.
Chess	Amateur Chess Player.
Kung Fu	First technical degree of Wing Chun Kung Fu.

Languages

Italian	Native
English	Professional working proficiency

Autorizzo il trattamento dei miei dati personali presenti nel CV ai sensi dell'art. 13 d. lgs. 30 giugno 2003 n. 196 - "Codice in materia di protezione dei dati personali" e dell'art. 13 GDPR 679/2016 - "Regolamento europeo sulla protezione dei dati personali".