September 2025

Alicia Negre

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Education

CERMICS/Inria, Matherials Team Noisy-Champs/Paris *Oct 2023 –*
PhD thesis supervised by Eric Cancès and Thomas Ayral

- Ongoing works on extending the Density Matrix Embedding Theory both theoretically and numerically (arXiv:2503.09881) and investigating the mathematical problems arising in this approach (arXiv:2603.17080)
- Participation to the IPAM long program on mathematical and computational challenges in Quantum Computing, fall 2023

ISAE - SUPAERO, Toulouse *Sept 2019 – March 2023*
Engineering degree

- **OTSU** (Earth observation and Universe sciences) - Data science for space observation, stellar physics, planetary systems, general relativity, scientific missions
- **SXS** (Complex systems) - Methods for solving PDE, HPC, Multiscale methods

Université Paul Sabatier, Toulouse *Sept 2022 – March 2023*
Master 2 of Mathematics for Research and Innovation - M2RI

- Non linear conservation laws, introduction to spectral theory, hyperbolic initial boundary value problems and numerical schemes.

Experience

Embedding methods for electronic structure calculation with classical/hybrid algorithms, supervised by Eric Cancès and Thomas Ayral *Noisy-Champs, France*
CERMICS *Apr 2023 – Sept 2023*

Research internship to start working on quantum embedding methods and quantum algorithms

- Hands on electronic structure calculation methods, on Qiskit and MyQLM for Variational Quantum algorithms for condensed matter physics and chemistry
- Start of the implementation of Density Matrix Embedding Theory following the mathematical procedure of Cancès and al. arXiv:2305.16472 in Julia

Intership - Study on the influence of the magnetic field in a supermassive stars formation region, supervised by Anaëlle Maury and Chat Hull *Gif-sur-Yvette, France - Santiago, Chile*
CEA,DAp - Cerro Calan Observatory *Sep 2021 – Mar 2022*

Research internship aimed at studying the behavior of the magnetic field in regions where supermassive stars form.

- Self-calibration of calibrated ALMA telescope data using CASA software (ALMA Observatory)
- Creation of magnetic field maps using polarized emissions from interstellar dust (continuum)
- Creation of maps of polarized emissions from molecular energy transitions (spectral line)

EPR experiment and Bell's parameter, supervised Sebastien Massenot *Toulouse*
DEOS, ISAE-Supaero *Sep 2021 – Mar 2022*

Research intership focusing on measuring Bell's parameter and the uncertainty surrounding the measurement of this parameter. https://doi.org/10.1119/5.0102516

- Measurements of the Bell parameter and automation of the measurement procedure using LabView software
- Simulation of the measurement of the Bell parameter and its uncertainty using the Monte Carlo method and optimization of the uncertainty with a genetic algorithm coded in Python

Computational skills

Languages: Julia, Python, Matlab, LateX, LabView, C