

Tony Salvi

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Curriculum Vitae

November 2025

Personal information

Born in Vendée, France, in 1999, I have French citizenship. My mother tongue is French, I also speak English at a professional level and have some basis in German.

Education

- 2025-2027: Postdoc in IMJ-PRG mentored by Jacek Jendredj and funded by his ERC INSOLIT.
- 2022-2025: PhD at Centre de Mathématiques Laurent Schwartz (École polytechnique) and Département de Mathématiques et applications (École Normale Supérieure) under the supervision of Cécile Huneau. The title of my thesis is "High-frequency limit for the Klein-Gordon-Maxwell equations".
- 2019-2022: Master in mathematics at Sorbonne Université, "Master Mathématiques et applications Parcours Mathématiques de la Modélisation"
- 2016-2019: Bachelor's degree in mathematics and computer science at Université de Nantes

Research Interest

My research topic is the study of partial differential equations arising from physics, mainly relativistic ones. More precisely, I am interested in understanding complex phenomena and deriving effective dynamics at the limit between different scales of description and different physical paradigms, such as quantum, classical, and relativistic physics. In my thesis, I looked at the behavior of high-frequency solutions to wave-type equations such as Klein-Gordon or Klein-Gordon-Maxwell equations. In the case where the high-frequency limit is also a semiclassical limit, one typically recovers relativistic fluid and kinetic equations as a limit system, e.g., the relativistic Euler equation, the relativistic Euler-Maxwell equations or the relativistic Vlasov-Maxwell equations. For this reason, the study of relativistic fluid and kinetic equations is also of great interest to me. The main tools I used for this work were semi-classical analysis, WKB analysis, and the modulated energy method. Overall, I like to adapt classical methods to the relativistic setting.

Article and preprints

3. **Semi-classical limit of the massive Klein-Gordon-Maxwell system toward the relativistic Euler-Maxwell system via an adapted modulated energy method**, Preprint February 2025, arXiv:2502.06622, To appear in *Annales Henri Poincaré*
2. **Semi-classical limit for Klein-Gordon equation toward relativistic Euler equations via an adapted modulated energy method**, Preprint July 2024, arXiv:2407.08066, Submitted
1. **Multi-phase high frequency solutions to Klein-Gordon-Maxwell equations in Lorenz gauge in $(3+1)$ Minkowski spacetime**, Preprint July 2024, arXiv:2407.03554, Submitted

Teaching

- 2022-2025: Tutorial assistant for the course MAA105 “Integral and Differential Calculus” in the Bachelor of Sciences at École Polytechnique (taught in English).
- 2023-2024: Mentor in charge of the reinforcement class for the course MAT361 “Introduction à l’analyse réelle” in the “Cycle Ingénieur polytechnicien” at École Polytechnique (taught in French).

Conferences and seminars

Here is a list of some conferences I attended :

- September 2024 : Aspects of cosmology, mathematics and physics at École polytechnique
- June 2024 : Nonlinear Waves and Fluids at University College London
- April 2024 : Curved spacetimes, field theory and beyond at Institut Henri Poincaré
- May 2024 : Turbulent-e-s Conference, at École polytechnique
- May 2024 Semiclapp : Semiclassical analysis and applications at Université Côte d’Azur
- December 2023 : SALVE Winter School in École Normale Supérieure
- June 2023 : New Trends in Mathematical Fluid Dynamics, Université Grenoble Alpes
- January 2023 : Conférence itinérante du GDR Analyse des équations aux dérivées partielles at Université de Nantes
- March 2022 : Aspects of Gravity Mathematics and Physics at Polytechnique
- February 2022 : Conférence itinérante du GDR Analyse des équations aux dérivées partielles in Vannes

I also often go to the Laurent Schwartz Seminar at École polytechnique and Institut des Hautes Études Scientifiques, as well as to the Seminar on Mathematical General Relativity at Laboratoire Jacques-Louis Lions. Here is the list of talks I gave :

- November 2025 : PDE Seminar in Institut de Mathématiques de Bordeaux at Université de Bordeaux
- November 2025 : Analysis Seminar in Laboratoire de Mathématiques Jean Leray at Université de Nantes
- July 2025 : Seminar on Mathematical General Relativity at Laboratoire Jacques-Louis Lions
- March 2025 : PhD students’ Colloquium, at Département de Mathématiques et Applications in École Normale Supérieure
- February 2025 : PhD students’ Seminar in Analysis at Laboratoire de mathématiques d’Orsay in Orsay
- January 2025 : Probability, Mathematical Physics, and Analysis Seminar at LAREMA in Angers
- January 2025 : PDE Seminar at IRMAR in Rennes
- December 2024 : Reading group on general relativity at Laboratoire Jacques-Louis Lions
- November 2024 : PDE Seminar at the Department of Mathematics and Applied Mathematics at the University of Crete
- June 2024 : Journée des doctorants du CMLS at École polytechnique
- April 2023 : Reading group on general relativity at École polytechnique and Laboratoire Jacques-Louis Lions

Others

From the Junior Scientific Visibility program of the Fondation Mathématique Jacques Hadamard I received a grant to spend the month of November 2024 in Heraklion to learn more about relativistic fluids.