SINATRA Alice's Curriculum Vitae

Professional address

Laboratoire Kastler Brossel, École Normale Supérieure
24 rue Lhomond, 75321 Paris
Phone and email: + 33 (0)1 44 32 25 72 ; alice[dot]sinatra@lkb[dot]ens[dot]fr

Education

- Laurea in Physics, University of Milan, Italy, 1993. Grade: 110/110 cum laude
- Ph.D. in Physics, University of Milan, Italy, 1997; Advisor: Luigi Lugiato, "Control of quantum noise in nonlinear optical systems using two-photon transitions"
- Habilitation, Université Paris VI, 2006, tel[dot]archives-ouvertes[dot]fr/tel-00117282.

Positions

- INFM postdoctoral fellowship, University of Milan, 1996-1997
- Individual Marie Curie Fellowship, ENS Paris, 1997-1999
- Lecturer (Maître de Conférences) at Collège de France (Cohen-Tannoudji Chair), 1999-2000
- Lecturer (Maître de Conférences) at Université Pierre et Marie Curie, 2000-2016
- Professor at Sorbonne Université, Paris, 2016-present.
- Promoted to PR1, national CNU pool, in 2022.

Appointments

- Member of the CNU (National Council of Universities), 2012-2015.
- Member of the ANR scientific evaluation committee, 2017.
- Head of studies of the Quantum Physics program of the ICFP International Master of ENS, 2013-2018.
- Board member of EGAS, European Group on Atomic Systems, 2019-2023.
- HCERES expert, 2019 and 2024.
- Member of the CNRS National Committee, section 04, January 2023 - September 2025.

Research Topics and Key Results

Atomic physics	**Optical pumping of helium-3 for lung imaging (experiment)**
→	New metastability-exchange optical pumping technique that works at high pressure and strong field: 25% polarization at 67 mbar at 1.5T.
Quantum optics	**Squeezed states of light, quantum non-demolition measurements**
→	World record for QND measurement in optics.
Quantum gases	**Bose-Einstein condensates: phase coherence properties, multimode description, non-perturbative classical fields**
→	Classical field and Wigner method for condensate dynamics at $T \neq 0$.
→	Intrinsic coherence time of a condensate at non-zero temperature.
→	Coherence time of a strongly-interacting condensate of paired fermions.
	Phonon damping in superfluids
→	Calculation of Landau-Khalatnikov damping via four-phonon processes.
→	Phonon-roton damping in cold fermions and in helium.
Quantum metrology	**Spin-squeezed states, entangled states, decoherence**
→	First realization of spin-squeezed states in a condensate.
→	Calculation of the theoretical squeezing limit in a multimode condensate.
	Multiparameter quantum metrology
→	Optimal estimation method with an ensemble of spin-squeezed atoms.
→	First demonstration of multiparameter estimation with quantum gain.

Teaching

For 15 years, I taught quantum mechanics and quantum statistical physics courses at the master's level. For 10 years, I promoted and organized exchange semesters abroad for undergraduate students. I currently teach the 12-ECTS master's course "Quantum Mechanics: Concepts and Foundations", the 6-ECTS undergraduate course "Analytical Mechanics", and I am co-coordinator of the second year of the Sorbonne Physics Bachelor's degree.

Publications and Conferences

Publications: 67 articles in peer-reviewed international journals, 2 popular-science articles, 2 book chapters. I have given 62 invited talks at international conferences and 14 general, Department, or Laboratory seminars, including 5 "colloquia" (2 at the Max Planck Institute Munich, University of Saarland, LENS Florence, University of Hannover), 1 "conversatorium" at IPAN Warsaw, and 1 seminar at Collège de France.

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