PERSONAL INFORMATION Michele Pini

EDUCATION AND TRAINING

November 2016 – Ongoing

PhD in Theoretical and Experimental Physics

Università di Camerino, Camerino (Italy)

Supervisors: Prof. Giancarlo Calvanese Strinati (giancarlo.strinati@unicam.it), Prof. Pierbiagio Pieri (pierbiagio.pieri@unicam.it)

Subject: Study of an attractive Fermi gas in the normal phase throughout the BCS-BEC crossover by means of diagrammatic approaches based on the t-matrix approximation with different degrees of self-consistency.

March 2014 – October 2016

Master's degree (Laurea Magistrale) in Physical and Astrophysical Sciences – Curriculum Physics of Matter

Università di Firenze, Firenze (Italy)

Grade: 110/110 cum laude

Average exams grade: 30/30

Master Thesis
Title: Signatures of magnetic crystals in a three-leg ladder system with synthetic gauge fields
Supervisor: Dr. Davide Rossini (davide.rossini@sns.it)

Co-supervisor: Prof. Leonardo Fallani (fallani@lens.unifi.it)

Purpose of the thesis: The purpose of the thesis was a theoretical study on the experimental feasibility of magnetic crystals that arise in three-leg ladder fermionic systems in the presence of a synthetic gauge field. In particular, I studied the effects of the harmonic trapping potential and of the interactions between particles. The study was performed by means of DMRG (Density Matrix Renormalization Group) simulations.
Additional information: This thesis was originated from a collaboration between the experimental group of Leonardo Fallani at the University of Florence and the theoretical group of Rosario Fazio at Scuola Normale Superiore in Pisa.

September 2010 – March 2014

Bachelor's degree (Laurea Triennale) in Physics and Astrophysics

Università di Firenze, Firenze (Italy)

Grade: 110/110 cum laude

Thesis
Title: Ultracold atoms in optical lattices: numerical solutions and applications in quantum computation
Supervisor: Prof. Leonardo Fallani (fallani@lens.unifi.it)

Purpose of the thesis: The purpose of the thesis was the calculation of the maximally localized Wannier functions for an optical lattice and of the parameters of the Bose-Hubbard model in order to study the experimental feasibility of a quantum C-phase gate operating on two nearest neighbour sites of the lattice. The program performing the calculation was written in Wolfram Mathematica language.

September 2005 – June 2010

Secondary school - Liceo Scientifico Castelnuovo (PNI)

Firenze (Italy)

Grade: 100/100

PNI (Piano Nazionale Informatica) class included more hours of Math and Physics than other classes.

PERSONAL SKILLS

| Mother tongue(s) | Italian |

Other language(s)

UNDERSTANDING		SPEAKING		WRITING
Listening	Reading	Spoken interaction	Spoken production	
B2	C1	B2	B2	C1
Cambridge ESOL Level 1 Certificate – Council of Europe Level B2				

English

Levels: A1/A2: Basic user - B1/B2: Independent user - C1/C2 Proficient user
Common European Framework of Reference for Languages

Scientific skills

- Good knowledge of *t*-matrix diagrammatic theories for the study of a Fermi gas through the BCS-BEC crossover acquired during the PhD.
- Good knowledge of DMRG (Density Matrix Renormalization Group) and TEBD (Time Evolution Block Decimation) methods acquired during the master thesis.
- Good knowledge of the Monte Carlo method and the Metropolis algorithm acquired during the Computational Laboratory class.
- Wide and specialized knowledge of ultracold atoms physics acquired during the "Atomic Physics" and "Physics of Ultracold Atoms" classes.
- Basic experimental skills on spectroscopy and laser characterization acquired during the "Atomic Physics Laboratory" class.

Communication skills

- Ability to perform PowerPoint presentations in English on my work, acquired during the master's degree and the PhD.
- Capability to participate in scientific discussions and to establish relationships with other physicists of my field acquired by attending multiple conferences during the PhD (both in Italy and abroad).

Digital competence

SELF-ASSESSMENT				
Information processing	Communication	Content creation	Safety	Problem solving
Proficient user	Proficient user	Independent user	Proficient user	Independent user

Levels: Basic user - Independent user - Proficient user
Digital competences - Self-assessment grid

| ECDL (European Computer Driving Licence) Certificate |

- Good knowledge of Fortran 90 programming acquired during the PhD.
- Good knowledge of C programming acquired during Informatics and Computational Laboratory classes.
- Good knowledge of Wolfram Mathematica programming acquired during both bachelor and master theses.
- Excellent knowledge of LaTeX acquired during bachelor, master and PhD thesis.
- Good knowledge of Office suite (word processor, spread sheet, presentation software).

Job-related skills

- Capability to explain physics topics to undergraduate students acquired by working as a tutor in the University of Camerino (about 60 hours of lessons).

Other skills

- Classified up to the national level of selection of the Olympics of Mathematics as a member of the team of Liceo Scientifico Castelnuovo (2010).

Driving licence   B, A2

ADDITIONAL INFORMATION ── ■

Publications   M. Pini, P. Pieri and G. Calvanese Strinati, *Fermi gas throughout the BCS-BEC crossover: Comparative study of t-matrix approaches with various degrees of self-consistency*, Phys. Rev. B 99, 094502 (2019).

T. Paintner, D. K. Hoffmann, M. Jäger, W. Limmer, W. Schoch, B. Deissler, M. Pini, P. Pieri, G. Calvanese Strinati, C. Chin and J. Hecker Denschlag, *Pair fraction in a finite-temperature Fermi gas on the BEC side of the BCS-BEC crossover*, Phys. Rev. A 99, 053617 (2019).

M. Pini, P. Pieri, M. Jäger, J. Hecker Denschlag, G. C. Strinati, *Pair correlations in the normal phase of an attractive Fermi gas*, arXiv:1912.04802 (2019).

Pubblicazione ai fini della Normativa in materia di Trasparenza ex D.Lgs 33/2013 e Trattamento dati personali

Il presente CV è oggetto di pubblicazione obbligatoria sul sito istituzionale UNICAM nella sezione "Amministrazione trasparente" ai sensi del D.Lgs. 33/2013;

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