

Francesca Cuteri

JUNIOR PROFESSOR · GOETHE UNIVERSITY, FRANKFURT AM MAIN, GERMANY

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📅 Feb 19, 1989 | 🇮🇹 Italian

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EXPERIENCE

Frankfurt, Germany

Institute for Theoretical Physics - Goethe University

Jan. 2020 - Present

JUNIOR PROFESSOR

- Participating in research activities (also as member of the 🔗 CRC-TR 211 project) on the Quantum Chromodynamics (QCD) phase diagram at zero, imaginary and isospin chemical potential using lattice techniques, with different fermion discretizations.

Frankfurt, Germany

Institute for Theoretical Physics - Goethe University

Nov. 2015 - Dec. 2019

POSTDOCTORAL RESEARCHER

- Participated in research activities (also as member of the 🔗 CRC-TR 211 project) on the Quantum Chromodynamics (QCD) phase diagram at zero, imaginary and isospin chemical potential using lattice techniques, with different fermion discretizations.
- Contributed to the development of 🔗 CL²QCD, a lattice QCD CPUs and GPUs application based on OpenCL.
- Managed large scale simulations in HPC clusters.
- Contributed to the development of the "PLASMA" python analysis suite for data from lattice simulations.
- Fulfilled teaching duties.
- Contributed to the development of the 🔗 ExerciseHandler as auxiliary bash tool for teaching activities.
- Supervised BSc students.
- Organized the 🔗 Lattice Journal Club Meeting.

EDUCATION

Rende, Italy

University of Calabria

Nov. 2012 - Feb. 2016

PH.D. IN PHYSICS

- Thesis: "Aspects of phase transitions in gauge theories and spin models on the lattice"

Advisor: Prof. Alessandro Papa

Abstract: Studies of phase transitions both in gauge theories, specifically QCD, and in two-dimensional spin models have been performed. The approach is numerical, taking advantage of the possibility to discretize the relevant theories and describe the addressed spin models by use of a lattice formulation, and strongly relies on suitably written/extended simulation and analysis software. Specifically, the nature/location of the thermal deconfinement/chiral phase transition in QCD has been studied, via the characterization of color-field flux tubes, as footprints for confinement, and via investigations at imaginary chemical potential. The addressed spin models are, instead, two-dimensional and characterized by non-Abelian symmetry groups. There the existence of topological, infinite order BKT phase transitions, along with the corresponding universality class, has been checked numerically.

Rende, Italy

University of Calabria

Oct. 2010 - Dec. 2012

M.Sc. IN PHYSICS

- Thesis: "Chromoelectric flux tubes in QCD"

Advisor: Alessandro Papa

Rende, Italy

University of Calabria

Oct. 2007 - Oct. 2010

B.Sc. IN PHYSICS

- Thesis: "The double well potential and instantons"

Advisor: Alessandro Papa

SKILLS

Programming:**Working knowledge** C/C++, Shell Script, Gnuplot, Python, \LaTeX , Slurm, OpenOffice**Basic knowledge** OpenCL, Fortran, Mathematica, HTML5**Code Suites** [CL²QCD](#), [MILC](#)**Languages** Italian (native), English (fluent), French (advanced), Greek (advanced), German (basic)

PUBLICATIONS

PREPRINTS

B. B. Brandt, F. Cuteri, G. Endrődi, S. Schmalzbauer, *Exploring the QCD phase diagram via reweighting from isospin chemical potential*, [arXiv:1911.12197](#)

M. Baker, V. Chelnokov, P. Cea, L. Cosmai, F. Cuteri, A. Papa, *The confining color field in SU(3) gauge theory*, [arXiv:1912.04739](#)

PAPERS IN PEER REVIEWED JOURNALS

2019 M. Baker, V. Chelnokov, P. Cea, L. Cosmai, F. Cuteri, A. Papa, *The nonperturbative color field in the SU(3) flux tube*, [Eur.Phys.J. C79 \(2019\) no.6, 478](#)

2018 F. Cuteri, O. Philipsen, A. Sciarra, *The QCD chiral phase transition from non-integer numbers of flavors*, [Phys.Rev. D97 \(2018\) no.11, 114511](#)

2017 P. Cea, L. Cosmai, F. Cuteri, A. Papa, *Flux tubes in the QCD vacuum*, [Phys.Rev. D95 \(2017\) no.11, 114511](#)

2016 C. Czaban, F. Cuteri, O. Philipsen, C. Pinke, A. Sciarra, *Roberge-Weiss transition in $N_f = 2$ QCD with Wilson fermions and $N_\tau = 6$* , [Phys.Rev. D93 \(2016\) no.5, 054507](#)

O. Borisenko, V. Chelnokov, F. Cuteri, A. Papa, *Berezinskii-Kosterlitz-Thouless phase transitions in two-dimensional non-Abelian spin models*, [Phys.Rev. E94 \(2016\) no.1, 012108](#)

P. Cea, L. Cosmai, F. Cuteri, A. Papa, *Flux tubes at finite temperature*, [JHEP 1606 \(2016\) 033](#)

2014 P. Cea, L. Cosmai, F. Cuteri, A. Papa, *Flux tubes in the SU(3) vacuum: London penetration depth and coherence length*, [Phys.Rev. D89 \(2014\) no.9, 094505](#)

CONFERENCE PROCEEDINGS

2019 B. B. Brandt, F. Cuteri, G. Endrődi, S. Schmalzbauer, *Dirac spectrum and the BEC-BCS crossover in QCD at nonzero isospin asymmetry*, [Particles 3 \(2020\) no.1, 80-86](#)

2018 F. Cuteri, O. Philipsen, A. Sciarra, *Progress on the nature of the QCD thermal transition as a function of quark flavors and masses*, [PoS LATTICE2018 170](#)

2018 M. Baker, V. Chelnokov, P. Cea, L. Cosmai, F. Cuteri, A. Papa, *Spatial structure of the color field in the SU(3) flux tube*, [PoS LATTICE2018 253](#)

2018 F. Cuteri, C. Czaban, O. Philipsen, A. Sciarra, *Updates on the Columbia plot and its extended/alternative versions*, [EPJ Web Conf. 175 \(2018\) 07032](#)

P. Cea, L. Cosmai, F. Cuteri, A. Papa, *QCD flux tubes across the deconfinement phase transition*, [EPJ Web Conf. 175 \(2018\) 12006](#)

2016 P. Cea, L. Cosmai, F. Cuteri, A. Papa, *Flux tubes in QCD with (2+1) HISQ fermions*, [PoS LATTICE2016 \(2016\) 344](#)

C. Czaban, F. Cuteri, O. Philipsen, C. Pinke, A. Sciarra, *The nature of the Roberge-Weiss Transition in $N_f = 2$ QCD with Wilson Fermions on $N_t = 6$ lattices*, [PoS LATTICE2015 \(2016\) 148](#)

P. Cea, L. Cosmai, F. Cuteri, A. Papa, *Anatomy of SU(3) flux tubes at finite temperature*, [PoS LATTICE2015 \(2016\) 322](#)

2014 P. Cea, L. Cosmai, F. Cuteri, A. Papa, *London penetration depth and coherence length of SU(3) vacuum flux tubes*, [PoS LATTICE2014 \(2014\) 350](#)

2013 P. Cea, L. Cosmai, F. Cuteri, A. Papa, *Flux tubes and coherence length in the SU(3) vacuum*, [PoS LATTICE2013 \(2013\) 468](#)

TEACHING ACTIVITY

<i>France</i> Jan 2020	Qualification aux Fonctions de Maître des Conférences - Conseil National des Universités ASSISTANT PROFESSOR QUALIFICATION
<i>Goethe University</i> Summer Sem. 2019	Lattice Quantum Field Theory CHIEF TUTOR AND TUTOR
<i>Goethe University</i> Winter Sem. 2017	Introduction to Programming for Physicists CO-CHIEF TUTOR, TUTOR AND SUBSTITUTE LECTURER
<i>Goethe University</i> Summer Sem. 2016, 2017	Quantum Field Theory II CHIEF TUTOR AND TUTOR
<i>Goethe University</i> Winter Sem. 2015, 2016	Quantum Field Theory I CO-CHIEF TUTOR AND TUTOR
<i>University of Calabria</i> Summer Sem. 2014	Calculus TUTOR

SEMINARS IN CONFERENCES AND WORKSHOP

<i>Paris, France</i> Jan 29-31, 2020	Rencontre de Physique des Particules Talk: <i>Signatures for the BCS phase in QCD at nonzero isospin asymmetry</i>
<i>Bormio, Italy</i> Jan 20-24, 2020	58th International Winter Meeting on Nuclear Physics 2020 Talk: <i>The BEC-BCS crossover and the Dirac spectrum in QCD at nonzero isospin asymmetry</i>
<i>Bielefeld, Germany</i> Jan 14, 2020	Theory Group Seminar Talk: <i>QCD at nonzero isospin asymmetry: signatures of the BCS phase from the Dirac spectrum</i>
<i>Bari, Italy</i> Dec 11-13, 2019	SM&FT 2019 - The XVIII Workshop on Statistical Mechanics and nonperturbative Field Theory Talk: <i>QCD at nonzero isospin asymmetry: the Dirac spectrum and the BEC-BCS crossover</i>
<i>Dubna, Russia</i> Sep 16-19, 2019	THMEC 2019: The II International Workshop on Theory of Hadronic Matter Under Extreme Conditions Invited talk: <i>Dirac spectrum and the BEC-BCS crossover in QCD at nonzero isospin asymmetry</i>
<i>Darmstadt, Germany</i> Jan 24, 2019	TU Darmstadt - Nuclear Physics Theory Seminar Invited talk: <i>Lattice explorations of the QCD phase diagram</i>
<i>Cosenza, Italy</i> Dec 19, 2018	Università della Calabria Invited talk: <i>QCD thermodynamics with nonzero isospin density</i>
<i>Maynooth, Ireland</i> Jul 31 - Aug 06, 2018	Confinement 2018: XIII Quark Confinement and the Hadron Spectrum Poster and short plenary talk: <i>On the order of the thermal transition in QCD as function of the number of quark flavours and their masses</i>
<i>Maynooth, Ireland</i> Jul 31 - Aug 06, 2018	Confinement 2018: XIII Quark Confinement and the Hadron Spectrum Poster: <i>Spatial distribution of colour fields in the $SU(3)$ flux tube</i>
<i>East Lansing, USA</i> Jul 22 - 28, 2018	Lattice 2018: The XXXVI International Symposium on Lattice Field Theory Talk: <i>Progress on the nature of the QCD thermal transition as a function of quark flavors and masses</i>
<i>Garching, Germany</i> Jun 21, 2018	Max-Planck-Institut für Quantenoptik Invited talk: <i>The QCD phase diagram from a lattice field theorist's viewpoint</i>
<i>Frankfurt, Germany</i> May 21 - 23, 2018	XQCD18: 16th International Conference on QCD in Extreme Conditions Poster: <i>The nature of the QCD thermal transition as a function of quark flavours and masses</i>
<i>Bielefeld, Germany</i> Mar 12 - 16, 2018	CRC-TR 211 Retreat Talk: <i>The QCD chiral phase transition from non-integer numbers of flavors</i>
<i>Bari, Italy</i> Dec 13 - 15, 2017	SM & FT 2017: The XVII workshop on Statistical Mechanics and non Perturbative Field Theory Invited talk: <i>The QCD chiral phase transition from non-integer numbers of flavors</i>

- Pisa, Italy*
Jun 26 - 28, 2017
XQCD17: 15th International Conference on QCD in Extreme Conditions
Poster: *QCD flux tubes across deconfinement*
- Granada, Spain*
Jun 18 - 24, 2016
Lattice 2017: The XXXV International Symposium on Lattice Field Theory
Talk: *Updates on the Columbia plot and its extended/alternative versions*
- Seattle, USA*
Mar 20 - 24, 2017
SIGN 2017: International Workshop on the Sign Problem in QCD and Beyond
Poster: *The chiral phase transition from non-integer number of flavors with staggered fermions*
- Giessen, Germany*
Feb 01, 2017
Seminar Theoretical Hadron Physics
Invited talk: *Extended QCD phase diagram from the lattice*
- Dubna, Russia*
Nov 1 - 3, 2016
THMEC 2016: Meeting of the working group on theory of hadronic matter under extreme conditions
Invited talk: *The chiral and deconfinement phase transition at/from imaginary chemical potential.*
- Southampton, UK*
Jul 24 - 30, 2016
Lattice 2016: The XXXIV International Symposium on Lattice Field Theory
Talk: *The chiral phase transition from non-integer flavour numbers with staggered fermions*
- Bari, Italy*
Dec 09 - 11, 2015
SM & FT 2015: The XVI workshop on Statistical Mechanics and non Perturbative Field Theory
Invited talk: *Flux tubes at finite temperature*
- Kobe, Japan*
Jul 24 - 30, 2015
Lattice 2015: The XXXIII International Symposium on Lattice Field Theory
Talk: *Anatomy of $SU(3)$ flux tubes at finite temperature*
- New York, USA*
Jun 23 - 28, 2014
Lattice 2014: The XXXII International Symposium on Lattice Field Theory
Talk: *London penetration depth and coherence length of $SU(3)$ vacuum flux tubes*
- Cortona, Italy*
May 28 - 31, 2014
New Frontiers in Theoretical Physics
Talk: *Flux tubes in the $SU(3)$ vacuum: London penetration depth and coherence length*
- Mainz, Germany*
Jul 29 - Aug 3, 2013
Lattice 2013: The XXXI International Symposium on Lattice Field Theory
Poster: *Flux tubes and coherence length in the $SU(3)$ vacuum*

ATTENDED SCHOOLS

- Stuttgart, Germany*
Oct 16 - 20, 2017
HLRS Parallel Programming Workshop - Fall 2017
On distributed/shared memory parallelization with MPI/OpenMP
- Rende, Italy*
Jun 30 - Jul 11, 2014
Summer School on Cloud Computing
On the usage of the most common cloud and virtualization open source platforms
- Regensburg, Germany*
Jun 24 - 27, 2013
STRONGnet 2013 Fellow's Workshop
On Monte Carlo Methods and Data Analysis in Lattice QCD

HONORS & AWARDS

- Maynooth, Ireland*
Aug 6, 2018
Best Poster Award
from the Poster Award Committee, for the poster "On the order of the thermal transition in QCD as function of the number of quark flavours and their masses" presented at 'Confinement 2018'
- Frankfurt, Germany*
Jun 29, 2018
Teaching Prize
from the Faculty of Physics, for tutorials of the lecture "Introduction to programming for physicists"

FUNDS RECEIVED

- Goethe University*
Jan, 2020
230000 Euro
from Goethe University and the Collaborative Research Center CRC-TR 211 as a start up grant for the Junior Professorship