CV

Miguel A. Escobedo

Personal details

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Summary

My expertise is the physics of heavy-ion collisions, especially heavy quarkonium suppression and jet quenching. I have published more than 40 articles, including regular papers and proceedings, and I have around 1150 citations. My h index is 18.

My scientific career started as a PhD student at the University of Barcelona under the supervision of Prof. Joan Soto. My thesis was about the application of Effective Field Theories (EFTs) to the study of Heavy Quarkonium (HQ) at finite temperatures. This pioneering work has had an important impact in the community because it has clarified the role of the HQ potential in heavy-ion collisions and opened a new way to study HQ in a medium.

After my PhD, I have been working as a postdoctoral researcher in some of the most important institutions in Europe in the field of heavy-ion collisions. I have worked in the group of Nora Brambilla at Munich's Technical University, in the group of Jean-Paul Blaizot at the CEA (Saclay) and the group of Tuomas Lappi in Jyväskylä. My most cited article, published in the Journal of High Energy physics in 2010, has 140 citations. This paper was a collaboration between the groups in Munich and Barcelona. This collaboration has lasted over the years, and it is still producing fruitful results. Something similar happens with my collaboration with J.P Blaizot. The results of my collaboration with the groups in Munich and Saclay are the only first principle QCD based studies of quarkonia in heavy-ion collisions. At the moment, I am working at IGFAE, one of the leading Galician research centres and a Maria de Maeztu excellence unit. There I am collaborating with Carlos Salgado and Elena Ferreiro on studies of hard probes in heavy-ion collisions. Recently I published my first single-authored paper.

I have presented the results of my research at many international conferences. I gave plenary talks at meeting with many attendants like Hard Probes 2018, which is the second most important conference in the field of heavy-ion collisions, Strong and Electroweak Matter 2018 and 2016 and Confinement 2016. Recently I participated in a plenary round-table discussion in Confinement 2021 about open quantum systems. Regarding conference organization, I participated in the organization of SCET 2014 and, in 2022, I co-organized and proposed the workshop "The quantumness of hard probes".

Due to the impact of my research, I often review articles for the most relevant journals in my field, for example, the Journal of High Energy Physics and Physical Review Letters. I recently became a member of the editorial board of Universe Letters.

Several European agencies have funded my research, for example, the European Research Council, the Academy of Finland and the Spanish Ministery of Science. I have been an FPU fellow, and part of my research was funded by a contract from the Research Training Network Flavianet.

Regarding teaching, during my PhD, I had the opportunity to collaborate in the teaching of Mary Variables Calculus to first-year students. In Munich, I collaborated in the supervision of several Bachelor thesis, like the one of Lukas Felsberger on relativistic hydrodynamics. I cosupervised the Master thesis of Daniel González Sampayo, a student at the University of Santiago, on numerical approaches to relativistic hydrodynamics. At the moment, I am cosupervising two master students. In the year 2021, I gave a lecture on Bad Honnef Physics School organized by the German Physical Society.

Current position

Postdoc researcher in Instituto **Galego de Física de Altas Enerxías** in the heavy ion group of **Carlos Salgado**.

Previous positions

Postdoc researcher in the physics department of **Jyväskylän Yliopisto** in the QCD group of Prof. **Tuomas Lappi**.
Postdoc researcher in **Institut de Physique Théorique** in the high temperature QCD group of Prof. **Jean-Paul Blaizot**.
Postdoc researcher in the physics department of **Technische Universität München** in the Effective Field Theories group of Prof. **Nora Brambilla**.

Education

- Ph. D in physics by the **University of Barcelona**, under the supervision of **Joan Soto**, finished in april of 2011.

  Ph. D thesis title **Heavy Quarkonium at finite temperature**

- Master in "Astrophysics, particle physics and cosmology" by University of Barcelona, 2007 (mark 9.2 out of 10).

  Master thesis title **Spectroscopy of hydrogen like atoms at finite temperature**

- Degree in Physics by University of Barcelona, 2006 (mark 3.37 out of 4).

Research interests

- QCD at extremely high temperatures.
- Open quantum systems.
- Jet quenching and jet broadening.
- Heavy quarkonium.
- Effective Field Theories, as for example NRQCD and SCET.

Programming

Several of my research projects had an important numerical component. For example, I have published a paper in Computer Physics Communications in which a C++ library is described. I am also familiar with the use of Python and Jupyter notebooks, having used in my research libraries like Numpy, Matplotlib and Qutip.

Published papers

H-index:18
Number of citations:1180
Average number of citations in published papers:41.2
Data taken from inspirehep

- **Simple model to include initial-state and hot-medium effects in the computation of quarkonium nuclear modification factor**
  Miguel Angel Escobedo and Elena Ferreiro
  Published in Physical Review D (Phys.Rev.D 105 (2022) 014019)
- **Bottomonium production in heavy-ion collisions using quantum trajectories: Differential observables and momentum anisotropy**
  Nora Brambilla, Miguel Angel Escobedo, Michael Strickland, Antonio Vairo, Peter Vander Griend and Johannes Heinrich Weber
  Published in Physical Review D (Phys. Rev. D 104 (2021) 094049)
- **QTRAJ 1.0: A Lindblad equation solver for heavy-quarkonium dynamics**
  Hisham Ba Omar, Miguel Angel Escobedo, Ajaharul Islam, Michael Strickland and Sabin Thapa
  Published in Computer Physics Communications (Comput.Phys.Commun. 273 (2022) 108266)
- **Phenomenological study of quarkonium suppression and the impact of the energy gap between singlets and octets**
  Jean-Paul Blaizot and Miguel Angel Escobedo
  Published in Physical Review D (Phys.Rev.D 104 (2021) 5, 05403)
- **Bottomonium suppression in an open quantum system using the quantum trajectories method**

Nora Brambilla, Miguel Angel Escobedo, Michael Strickland, Antonio Vairo and Peter Vander Griend
Published in Journal of High Energy Physics (JHEP 05 (2021) 136)

- **Medium evolution of a static quark-antiquark pair in the large N_c limit**
  Miguel Angel Escobedo
  Published in Physical Review D (Phys.Rev.D 103 (2021) 3, 034010)

- **The dipole picture and the non-relativistic expansion**
  Tuomas Lappi and Miguel Angel Escobedo
  Published in Physical Review D (Phys.Rev.D 101 (2020) 3, 034030)

- **Transport coefficients from in medium quarkonium dynamics**
  Nora Brambilla, Antonio Vairo, Peter Vander Griend and Miguel Angel Escobedo
  Published in Physical Review D (Phys.Rev. D100 (2019) no.5, 054025)

- **The approach to equilibrium of a quarkonium in a quark-gluon plasma**
  Jean-Paul Blaizot and Miguel Ángel Escobedo
  Published in Physical Review D (Phys.Rev. D98 (2018) no.7, 074007)

- **Quantum and Classical Dynamics of Heavy Quarks in a Quark-Gluon Plasma**
  Jean-Paul Blaizot and Miguel Ángel Escobedo
  Published in Journal of High Energy Physics (JHEP 1806 (2018) 034)

- **Heavy quarkonium suppression in a fireball**
  Nora Brambilla, Joan Soto, Antonio Vairo and Miguel Ángel Escobedo
  Published in Physical Review D (Phys.Rev. D97 (2018) no.7, 074009)

- **Quarkonium suppression in heavy-ion collisions: an open quantum system approach**
  Nora Brambilla, Antonio Vairo, Joan Soto and Miguel Ángel Escobedo
  Published in Physical Review D (PRD 96 (2017) 034021)

- **Momentum anisotropy effects for quarkonium in a weakly-coupled quark-gluon plasma below the melting temperature**
  Simone Biondini, Nora Brambilla, Antonio Vairo and Miguel Ángel Escobedo
  Published in Physical Review D (PRD 95 (2017) no.7, 074016)

- **Multi-particle correlations and KNO scaling in the medium-induced jet evolution**
  Edmond Iancu and Miguel Ángel Escobedo
  Published in Journal of High Energy Physics (JHEP 1612 (2016) 104)

- **Event-by-event fluctuations in the medium-induced jet evolution**
  Edmond Iancu and Miguel Ángel Escobedo
  Published in Journal of High Energy Physics (JHEP 1605 (2016) 008)

- **CP asymmetry at finite temperature for degenerate heavy neutrino masses**
  Simone Biondini, Nora Brambilla, Antonio Vairo and Miguel Ángel Escobedo
  Published in Journal of High Energy Physics (JHEP 1603 (2016) 191)

- **The relation between cross section, decay width and imaginary potential of heavy quarkonium in a quark-gluon plasma**
  Miguel Ángel Escobedo
  Published in Journal of Physics:Conference Series (J. Phys. Conf. Ser. 503 (2014) 012026)

- **An effective field theory for non-relativistic Majorana neutrinos**
  Simone Biondini, Nora Brambilla, Antonio Vairo and Miguel Ángel Escobedo
  Published in Journal of High Energy Physics (JHEP 1312 (2013) 028)

- **The relation between cross section, decay width and imaginary potential of heavy quarkonium in a quark-gluon plasma**
  Miguel Ángel Escobedo
  Published in Nuclear Physics A (Nucl. Phys. A910-011 (2013) 227-230)

- **Heavy quarkonium dissociation at finite temperature with effective field theories**
  Miguel Ángel Escobedo
  Published in Proceedings of Science (PoS Confinement (2012) 204)

- **Heavy Quarkonium moving in a Quark-Gluon Plasma**
  Floriana Giannuzzi, Massimo Mannarelli, Joan Soto and Miguel Ángel Escobedo
  Published in Physical Review D (Phys. Rev. D 87, 114005 (2013))

- **Thermal width and quarkonium dissociation by inelastic parton scattering**
  Nora Brambilla, Jacopo Ghiglieri, Antonio Vairo and Miguel Ángel Escobedo
  Published in Journal of High Energy Physics (JHEP05(2013)130)

- **Gauge invariant definition of the jet quenching parameter**
  Michael Benzke, Nora Brambilla, Antonio Vairo
  and Miguel Ángel Escobedo
  Published in Journal of High Energy Physics (JHEP02 (2013)129)

- **Thermal width and gluo-dissociation of quarkonium in pNRQCD**
  Nora Brambilla, Jacopo Ghiglieri, Antonio Vairo and Miguel Ángel Escobedo
  Published in Journal of High Energy Physics (JHEP12(2011)116)

- **The spin-orbit potential and Poincaré invariance in finite temperature pNRQCD**
  Nora Brambilla, Jacopo Ghiglieri, Antonio Vairo and Miguel Ángel Escobedo
  Published in Journal of High Energy Physics (JHEP07(2011)096)

- **Non-relativistic bound states in a moving thermal bath**
  Massimo Mannarelli, Joan Soto and Miguel Ángel Escobedo
  Published in Physical Review D (Phys. Rev. D 84, 016008 (2011))

- **Heavy Quarkonium in a weakly-coupled quark-gluon plasma below the melting Temperature**
  Nora Brambilla, Jacopo Ghiglieri, Joan Soto, Antonio Vairo and Miguel Ángel Escobedo
  Published in Journal of High Energy Physics (JHEP09(2010)038).

- **Nonrelativistic bound states at finite temperature (II): The muonic hydrogen**
  Joan Soto and Miguel Ángel Escobedo
  Published in Physical Review A (Phys. Rev. A 82, 042506 (2010))

- **Effective field theory and dispersion law of the phonons of a non-relativistic superfluid**
  Cristina Manuel and Miguel Ángel Escobedo
  Published in Physical Review A (Phys. Rev. A 82, 023614 (2009))

- **Non-relativistic EFT for hydrogen atom at finite T**
  Miguel Ángel Escobedo
  Published in Proceedings of Science (PoS(EFT 09)021 (2009))

- **Bulk viscosities for cold Fermi superfluids close to the unitary limit**
  Massimo Mannarelli, Cristina Manuel and Miguel Ángel Escobedo
  Published in Physical Review A (Phys. Rev. A 79, 063623 (2009))

- **Nonrelativistic bound states at finite temperature: The hydrogen atom**
  Joan Soto and Miguel Ángel Escobedo
  Published in Physical Review A (Phys. Rev. A 78, 032520 (2008))

List of raised third party funding

- FPU grant of "Ministerio de Educación y Ciencia" from Spain, started at april of 2007 with end at april of 2011.

- "Early Stage Researcher" contract by the RTN Flavianet.
  Collaboration with Nora Brambilla and Antonio Vairo.
  From April to May 2008

Participation in international conferences

Here I list a selection of my talks and participation at scientific meetings.

- A Virtual Tribute to Quark Confinement and the Hadron Spectrum
  Stavanger (on-line), Norway, 2021
  Member of the round table "Open Quantum Systems"

- Hard probes 2018: International Conference on Hard and Electromagnetic Probes of High-Energy Nuclear Collisions
  Aix-les-bains, France, 2018
  Plenary talk "Lattice and EFT approaches for hard probes in QCD matter"

- Strong and Electroweak Matter 2018
  Barcelona, Spain, 2018
  Talk "Open quantum systems approach to the study of quarkonium suppression"

- The 9th International Workshop on Charm Physics
  Novosibirsk, Russia, 2018
  Talk "Effective field theory calculations in open charm and charmonium production in media"

- XIIth Quark Confinement and the Hadron Spectrum
  Thessaloniki, Greece, 2016
  Plenary talk "Effective Field Theories for heavy probes in a hot QCD plasma and in the early universe"

- Strong and Electroweak Matter 2014
  Lausanne, Switzerland, 2014
  Talk given ”EFTs for non-relativistic particles in a medium: Application to quarkonium and Majorana neutrinos”

Organization of Schools, Seminars and Workshops

- 19th International Conference on Hadron Spectroscopy and Structure in memoriam Simon Eidelman (HADRON 2021)
  UNAM (on-line), Mexico, 2021
  Convener of hot QCD session

- 18th International Conference on Hadron Spectroscopy and Structure in memoriam Simon Eidelman (HADRON 2019)
  Guilin, China, 2019
  Convener of hot QCD session

- SCET2014: XIth Annual Workshop on Soft-Collinear Effective Theory
  Munich, Germany, 2014
  Member of organizing committee

Teaching experience

- Problems of ”Càlcul de diverses variables”
  Course of the Degree in Physics of the University of Barcelona about mathematical analysis with two or more variables
  Spring semester 2009-2010. Autumn and Spring semesters 2010-2011.

- List of Bachelor students which I assisted with their thesis during my postdoc at TUM:

  – Georg Stockinger. Bachelor’s Thesis. *Quarkonium dissociation at the Large Hadron Collider.*

  – Lukas Felsberger. Bachelor’s Thesis. *Application of Hydrodynamics to Heavy Ion Collisions.*

- Collaboration in the direction of the Master’s Thesis of Daniel Gonzalo Sampayo at USC on ”Relativistic Hydrodynamics”.

- Lecturer in the Bad Honnef Physics School ”Methods of Effective Field Theory and Lattice Field Theory (online)” 2021
  Lecturing on ”Introduction HTL, NRQCD and pNRQCD at finite temperature”.

Stays Abroad

- Dipartamento di Fisica, Universita di’ Milano.
  From the 1st of March to 31th of May, 2008
  Collaboration with Professors Nora Brambilla and Antonio Vairo.

- Fakultät für Physik, Universität Bielefeld
  From the 20th of September to 20th of December, 2009
  Collaboration with Professor Mikko Laine.

Outreach activities

- Outreach talk ”El colorido mundo de la interacción fuerte”
  Talk given at College d’Espagne in Paris for a non-scientific audience
- Outreach talk ”O LHC: O mellor acelerador de partículas do mundo”
  Talk given at IES Eusebio da Guarda, A Coruña

Languages

Spanish:Mother tongue
Catalan:Mother tongue
English:Fluent
French:Intermediate
German:Intermediate
Italian:Basic knowledge