

# MIKEL PALMERO

## Postdoctoral Research Fellow

📅 Birth date: 24-03-1989    🇪🇸 Nationality: Spanish  
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## PROFESSIONAL EXPERIENCE

### Assistant Professor

#### Applied Physics I department, University of the Basque Country

📅 July 2020 – Present    📍 Bilbao, Spain

- Teaching: Physics in 1st year engineering courses.
- Independence for research line. Starting a new line to apply “Short-cuts to adiabaticity” to engineering systems.
- Supervising one student for the master thesis.

### Postdoctoral Research Fellow

#### Science and Math Cluster, Singapore University of Technology and Design (SUTD)

📅 September 2017 – December 2019    📍 Singapore

- Topic: Many-Body Open Quantum Systems.
- Goal: Study and manipulate the interactions in large quantum systems under the influence of the environment.
- Skills: Master Equation solving, High Performance Computing (Super-computer).

### Co-President

#### SUTD PostDoc Society

📅 April 2019 – December 2019    📍 Singapore

- Responsible for all Postdoc Society events.
- Regular meetings with provosts, management, and head of departments.
- Responsible for the fundraising and organization of a yearly academic conference (Research Fest).
- More info: [Postdoc Society webpage](#).

### Social Event Coordinator

#### SUTD PostDoc Society

📅 January 2018 – March 2019    📍 Singapore

- Responsible of a monthly social gathering for SUTD Postdoctoral Researchers.
- Collaboration in general purpose committee tasks: Meetings, academic event organization, fundraising...

### Postdoctoral Research Fellow

#### Department of Physical Chemistry, University of the Basque Country

📅 February 2017 – September 2017    📍 Bilbao, Spain

- Tasked to mentor 2 new PhD students in the group.

### PhD student in Quantum Science and Technology

#### Department of Physical Chemistry, University of the Basque Country

📅 February 2013 – January 2017    📍 Bilbao, Spain

## LANGUAGES

Spanish (Native)    ●●●●●

Basque (Native)    ●●●●●

English    ●●●●●

German    ●●●●●

Chinese (only spoken)    ●●●●●

## SOFT SKILLS

- Analytical thinking    Resiliency
- Collaborative    Leadership
- Willingness to learn

## TECHNICAL SKILLS

- Matlab    Python    PBS
- Keynote/Power Point
- Numerical simulations
- LaTeX    C++    Report writing
- Comprehensive Research

## RELEVANT COURSES

- Multiple online courses in the MATLAB Academy.
- NSCC given courses on supercomputing job submission and job parallelization.

- Topic: Shortcuts to Adiabaticity in Trapped Ions.
- Goal: Design theoretical protocols to improve the manipulation of trapped ions in processes necessary for quantum computing.
- Skills: Schrödinger Equation solving, optimization problems.

### Assistant Teacher in Undergrad Courses

Department of Physical Chemistry, University of the Basque Country

📅 2014 – 2017

📍 Bilbao, Spain

Chemistry lab assistant in undergrad level for over a 100 hours:

- "Experimentation in Chemical Physics" course: Grad in Chemistry.
- "Thermodynamics and Chemical Kinetics" course: Grad in Biology.
- "Chemistry II" course: Grad in Chemistry.

### Research Assistant in Quantum Science and Technology

Department of Physical Chemistry, University of the Basque Country

📅 July 2012 – January 2013

📍 Bilbao, Spain

## 📄 JOURNAL PUBLICATIONS

- 18) **"Invariant-based inverse engineering of time-dependent, coupled harmonic oscillators"**  
A. Tobalina, E. Torrontegui, I. Lizuain, M. Palmero, J. G. Muga  
Phys. Rev. A **102**, 063112 (2020).
- 17) **"Time-dependent harmonic potentials for momentum or position scaling"**  
J. G. Muga, S. Martínez-Garaot, M. Pons, M. Palmero, A. Tobalina  
Phys. Rev. Research **2**, 043162 (2020).
- 16) **"Trapped-ion Fock-state preparation by potential deformation"**  
M. A. Simón, M. Palmero, S. Martínez-Garaot, J. G. Muga  
Phys. Rev. Research **2**, 023372 (2020).
- 15) **"Towards generation of cat states in trapped ions set-ups via FAQUAD protocols and dynamical decoupling"**  
Mikel Palmero, Miguel Ángel Simón, Dario Poletti  
Entropy **21(12)**, 1207 (2019).
- 14) **"Thermalization with detailed-balanced two-site Lindblad dissipators"**  
Mikel Palmero, Xiansong Xu, Chu Guo, Dario Poletti  
Phys. Rev. E **100**, 022111 (2019).  
**Figure chosen by PRE for the August Kaleidoscope**
- 13) **"Fast atom transport and launching in a nonrigid trap"**  
A. Tobalina, M. Palmero, S. Martínez-Garaot, J. G. Muga  
Sci. Rep. **7**, 5753 (2017).
- 12) **"Dynamical normal modes for time-dependent Hamiltonians in two dimensions"**  
I. Lizuain, M. Palmero, J. G. Muga  
Phys. Rev. A **95**, 022130 (2017).
- 11) **"Fast phase gates with trapped ions"**  
M. Palmero, S. Martínez-Garaot, D. Leibfried, D. J. Wineland, J. G. Muga  
Phys. Rev. A **95**, 022328 (2017).
- 10) **"Fast driving between arbitrary states of a quantum particle by trap deformation"**  
S. Martínez-Garaot, M. Palmero, D. Guéry-Odelin, J. G. Muga  
Phys. Rev. A **94**, 063418 (2016).
- 9) **"Shortcuts to adiabaticity for an ion in a rotating radially-tight trap"**

## EDUCATION

Master degree in Quantum Science and Technology

University of the Basque Country

📅 2011 – 2012

📍 Bilbao, Spain

- Master thesis: "Quantum Backflow"

Bachelor degree in Physics

University of the Basque Country

📅 2007 – 2011

📍 Bilbao, Spain

- Specialization in "Theoretical Physics"
- Bachelor thesis: 'Review of the Yun Wang Model of the Accelerated Expanding Universe from Current Observational Data'

## 🏆 FELLOWSHIPS AND PRIZES

- 2019 Extraordinary thesis award for the 2016/17 school year granted by the University of the Basque Country
- 2012 PhD fellowship for 4 years by the University of the Basque Country
- 2012 PhD fellowship for 3 years by the University of Cork (declined)
- 2007 "Matrícula de Honor de Bachiller" (graduated in high school with honors)

M. Palmero, Shuo Wang, D. Guéry-Odelin, Jr-Shin Li, J. G. Muga  
New J. Phys. **18** 043014 (2016).

**Video abstract highlighted by New Journal of Physics as one of the top 5 of 2016.**

- 8) **“Fast bias inversion of a double well without residual particle excitation”**  
S. Martínez-Garaot, M. Palmero, D. Guéry-Odelin, J. G. Muga  
Phys. Rev. A **92**, 053406 (2015).
- 7) **“Fast separation of two trapped ions”**  
M. Palmero, S. Martínez-Garaot, U. G. Poschinger, A. Ruschhaupt, J. G. Muga  
New J. Phys. **17**, 093031 (2015).
- 6) **“Fast expansions and compressions of trapped ion-chains”**  
M. Palmero, S. Martínez-Garaot, J. Alonso, J. P. Home, J. G. Muga  
Phys. Rev. A **91**, 053411 (2015).
- 5) **“Optimal transport of two ions under slow spring-constant drifts”**  
Xiao-Jing Lu, Mikel Palmero, Andreas Ruschhaupt, Xi Chen, Juan Gonzalo Muga  
Phys. Scr. **90**, 074038 (2015).
- 4) **“Fast transport of mixed-species ion chains within a Paul trap”**  
M. Palmero, R. Bowler, J. P. Gaebler, D. Leibfried, J. G. Muga  
Phys. Rev. A **90**, 053408 (2014).
- 3) **“Interference of spin-orbit-coupled Bose-Einstein condensates”**  
Sh. Mardonov, M. Palmero, M. Modugno, E. Ya. Sherman, J. G. Muga  
EPL **106**, 60004 (2014).
- 2) **“Fast transport of two ions in an anharmonic trap”**  
M. Palmero, E. Torrontegui, D. Guéry-Odelin, J. G. Muga  
Phys. Rev. A **88**, 053423 (2013).
- 1) **“Detecting quantum backflow by the density of a Bose-Einstein condensate”**  
M. Palmero, E. Torrontegui, J. G. Muga, M. Modugno  
Phys. Rev. A **87**, 053618 (2013).

## INVITED TALKS AND ORGANIZATION

### Invited talks at international conferences (3)

- |      |  |
|------|--|
| 2019 | IPS Meeting 2019, Singapore                          |
| 2014 | STA2014, Shanghai, China<br>ECTI2014, Mainz, Germany |

### Invited talks at international institutions (4)

- |      |  |
|------|--|
| 2017 | University of New Mexico (videoconference)         |
| 2015 | NIST Boulder<br>The Hebrew University in Jerusalem |
| 2014 | ETH Zurich   |

### Organization of international conferences (3)

- |      |  |
|------|--|
| 2019 | IPS Meeting 2019, Singapore<br>Research Fest 2019, Singapore |
| 2012 | STA2014, Bilbao, Spain                                       |

## VISITING SCHOLAR

### Xi Chen Group

#### Shanghai University

 July 2012  Shanghai, China

- Host: Xi Chen
- 1 month visit

### Xi Chen Group

#### Shanghai University

 June-August 2012  Shanghai, China

- Host: Xi Chen
- 2 month visit

### Jonathan Home Group

#### ETH Zurich

 October 2013  Zurich, Switzerland

- Host: Joseba Alonso
- 1 week visit
- Invited talk

### David Wineland Group



#### NIST Boulder

 May-June 2015  Boulder, USA

- Host: Dietrich Leibfried
- 2 week visit
- Invited talk

### Ronnie Kosloff Group

#### The Hebrew University

 November 2015  Jerusalem, Israel

- Host: Erik Torrontegui
- 1 week visit
- Invited talk

# TEACHING

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## 2020/21 School year

📍 Bilbao, Spain

- Physics I and II
    - Grad in “Marine Engineering” and “Navigation and Transportation”
    - 90 hours, lead teaching lectures and exercise class
  - Fundamentals of Physics for Engineers
    - Grad in “Electrical Engineering”, “Industrial-Electrical Engineering” and “Mechanical Engineering”
    - 120 hours, lead teaching lectures, group exercise class and lab class
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## 2016/17 School year

📍 Bilbao, Spain

- Experimentation in Chemical Physics
    - Grad in “Chemistry”
    - 16 hours lab assistant
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## 2015/16 School year

📍 Bilbao, Spain

- Chemistry II
    - Grad in “Physics” and “Geology”
    - 24 hours lab assistant
  - Experimentation in Chemical Physics
    - Grad in “Chemistry”
    - 36 hours lab assistant
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## 2014/15 School year

📍 Bilbao, Spain

- Thermodynamics and Chemical Kinetics
  - Grad in “Biology”
  - 20 hours lab assistant
- Experimentation in Chemical Physics
  - Grad in “Chemistry”
  - 18 hours lab assistant