Dr. David **Freire Fernández**

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Experience

Present
Oct 2024

Postdoctoral Researcher at Los Alamos National Laboratory
Dr. Takeyasu Ito's Group, Los Alamos National Laboratory

- Co-leading the design and implementation of experimental setups for precision measurements of neutron properties.
- Driving efforts to identify, analyze, and minimize systematic uncertainties, ensuring the highest accuracy and reliability in experimental results.

Sep 2024
Jul 2024

Postdoctoral Researcher at Max Planck Institute for Nuclear Physics
Prof. Klaus Blaum's Group, Max Planck Institute for Nuclear Physics | Prof. Yuri A. Litvinov's Group, GSI Helmholtz Center for Heavy Ion Research GmbH

- Lead the data analysis of a recent experimental campaign.
- Lead the writing and publication of multiple scientific manuscripts.
- Co-lead forthcoming international experiments, overseeing all aspects including planning, management, software, and hardware implementation.

Jun 2024
Oct 2021

Doctoral Candidate
Prof. Klaus Blaum's Group, Max Planck Institute for Nuclear Physics | Prof. Yuri A. Litvinov's Group, GSI Helmholtz Center for Heavy Ion Research GmbH | PD. Wolfram Korten's Group, CEA Paris-Saclay

- Independently and collaboratively developed and implemented multiple software tools for data analysis and identification, subsequently utilized in other storage ring experiments.
- Successfully analyzed independently the heavy-ion-induced signals in non-destructive detectors at storage rings, determining the partial half-life of the nuclear two-photon decay.
- Leading the writing and publication of multiple scientific manuscripts.
- Participated in various international experiments in atomic, nuclear, and astrophysics fields utilizing storage ring and gamma spectroscopy.
- Contributed to the development of experimental proposals in storage ring spectrometry and gamma spectroscopy at numerous research facilities.
- Co-leading a forthcoming international experiment, overseeing all aspects including planning, management, software, and hardware implementation.

Aug 2021
Feb 2021

Junior Researcher
Prof. Daniel Rodríguez Rubiales' Group, Laboratory of Ion Traps and Lasers of the University of Granada

- Designed and characterized a non-standard micro Penning trap doublet, enabling manipulation, optical detection, and ensuring ultra-high vacuum and cryogenic performance for enhanced precision in mass spectrometry applications.
- Implemented laser regulation and control for laser spectroscopy, facilitating photoionization, laser cooling techniques and creating qubits in ion traps.
- Operated and managed a 7 T Penning trap beam line.

Education

Jun 2024
Oct 2021

University of Heidelberg, Germany
Ph.D. in Physics, magna cum laude
Thesis : *First nuclear two-photon decay measurements at storage rings*

Sep 2021
Oct 2020

University of Granada, Spain
M.Sc. in Physics
Thesis : *Implementation of a micro-trap system for experiments with two-ion crystals*

Sep 2020
Sep 2016

University of Granada, Spain
B.Sc. in Physics
Thesis : *Detection of the fluorescence of ^{40}Ca ions in ion traps*

Publications

ORCiD : David Freire-Fernández | 0000-0002-5898-9291

2024 | **Measurement of the Isolated Nuclear Two-Photon Decay in ^{72}Ge**
D. FREIRE-FERNÁNDEZ; et al.
Physical Review Letters 133, 022502

2024 | **First Proton-Induced Cross Sections on a Stored Rare Ion Beam : Measurement of 118Te(p,γ) for Explosive Nucleosynthesis**
S. DELLMANN; et al.
Under review in Physical Review Letters

2024 | **Laser spectroscopy of accelerator-produced hydrogen-like ^{208}Bi^{82+} – a test of strong-field QED with 10^5 ions**
M. HORST; et al.
Under review in Nature Physics

2024 | **First simultaneous measurement of the gamma -ray and neutron emission probabilities in inverse kinematics at a heavy-ion storage ring**
M. SGUAZZIN; et al.
Accepted in Physical Review C

2024 | **First electron conversion factor measurements at storage rings**
D. FREIRE-FERNÁNDEZ; et al.
Manuscript in preparation

2024 | **$B\rho$-cutted combined Schottky plus Isochronous Mass Spectrometry (S+IMS)**
D. FREIRE-FERNÁNDEZ; et al.
Manuscript in preparation

2024 | **The first in-beam reaction measurement at CRYRING@ESR using the CARME array**
J. MARSH; et al.
European Physical Journal A 60, 95

2023 | **TDMchopS : A toolkit for automatic chopping of continuously acquired complex valued radio frequency samples**
D. FREIRE-FERNÁNDEZ
Zenodo

2023 | **RionID : Collection of code for the identification of ringed ions in Python**
D. FREIRE-FERNÁNDEZ; G. HUDSON-CHANG
Zenodo

2023 | **First measurement of the neutron-emission probability with a surrogate reaction in inverse kinematics at a heavy-ion storage ring**
M. SGUAZZIN; et al.
Accepted in Physical Review Letters

2023 | **Indirect measurements of neutron-induced reaction crosssections at heavy-ion storage rings**
M. SGUAZZIN; et al.
EPJ Web of Conferences 279, 11006

2023 | **Proton capture on stored radioactive Te ions**
S. F. DELLMANN; et al.
EPJ Web of Conferences 279, 11018

Teaching

Oct 2024
2022 | **Co-supervision of internship and summer students**
GSI, Darmstadt, Germany

Winter 2023 | **PAP1 : Experimental laboratory practice for Bachelor students in Physics and Education**
University of Heidelberg, Heidelberg, Germany

Conference Presentations

Oct 2024 | (Invited talk) Shapes and Symmetries in Nuclei : from Experiment to Theory, Orsay, France

Sep 2024 | (Invited talk) 21st SPARC Topical Workshop, Münster, Germany

Aug 2024	(Invited talk) LANL P-3 Seminar, NM, USA
Oct 2023	(Invited talk) NUSTAR Week 2023, Bucharest, Romania
Jun 2023	(Talk + Poster) Nuclear Chemistry Gordon Research Seminar and Conference, NH, USA
Mar 2023	(Talk) DPG-Frühjahrstagung SAMOP, Hannover, Germany
Feb 2023	(Invited talk) NUSTAR Collaboration Meeting, GSI, Darmstadt, Germany
Nov 2022	(Invited talk) Café du Lundi du DPhN, CEA, Saclay, France
Nov 2022	(Invited talk) AP Seminar, GSI, Darmstadt, Germany
Sep 2022	(Talk + Poster) Euroschool On Exotic Beams, Huelva, Spain
May 2022	(Poster) 100 Years of Nuclear Isomers, Berlin, Germany
Mar 2022	(Talk) DPG-Frühjahrstagung HK, Mainz, Germany
Mar 2022	(Talk) DPG-Frühjahrstagung SAMOP, Erlangen, Germany
May 2021	(Talk + Poster) Quantum Information Spain (ICE 6), online

Additional Activities

Jun 2024 Nov 2021	**Student representative of ILIMA (NUSTAR)** *GSI, Darmstadt, Germany*
Mar 2023 Nov 2022	**Guest scientist at the Laboratori Nazionali di Legnaro** *INFN-LNL, Italy*
Dec 2022 Oct 2022	**Guest scientist at the Institut de Recherche sur les lois Fondamentales de l'Univers** *CEA Paris-Saclay, France*
Jul 2022	**Softskill course** *Making an impact as an effective researcher*
Jun 2024 Mar 2022	**HGS-HIRe for FAIR participant** *Helmholtz Graduate School for Hadron and Ion Research, GSI, Darmstadt, Germany*
2024 2022	**Member of the DPG** *(Deutsche Physikalische Gesellschaft)*
Aug 2022	**Deep Learning School "Basic Concepts" of ErUM-Data-Hub** *(Deutsche Physikalische Gesellschaft)*
Oct 2024 Oct 2021	**Member of SPARC, ILIMA** *GSI, Darmstadt, Germany*
Oct 2024 Oct 2021	**Guest scientist at GSI** *GSI, Darmstadt, Germany*

Languages

Spanish | Native
English | Fluent C1/C2
German | Intermediate A2/B1
French | Beginner A1/A2

Grants and Awards

2022 | PROCOPE Mobility Program, DAAD
2021 | Researcher Fellowship, P18-FR-3432
2020 | ICARO Internship, UGR

Programming

Languages | Python, C++, C, Fortran
OS | Linux, macOS, Windows
Workflow | Git, Docker
Frameworks | GEANT4, Root