

# Hassane Hamdaoui

POSTDOCTORAL RESEARCHER · DATA SCIENTIST

Uppsala, Sweden

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## Summary

PhD in Physics with expertise in advanced data analysis, statistical modeling, and machine learning. Led precision measurements and new physics searches using data from world-class experiments, including **ATLAS**, **KM3NeT** and **IceCube**. Skilled in extracting insights from complex and large datasets and applying analytical techniques in high-performance computing environments.

## Work Experience

### Uppsala University

Uppsala, Sweden

POSTDOCTORAL ASSOCIATE

Feb. 2024 – Present

- Leading efforts in **data analysis** and **software development** to support high-impact research projects
- Using LHC data collected by ATLAS experiment for search for exotic particles using data driven background estimation.
- Developing and optimizing a web application to query run data from multiple databases, process relevant information, and store it in a dedicated PostgreSQL database on the back end, with ReactJS powering the front-end operations.
- Collaborating with cross-functional teams in the field of data-driven analysis, physics and software.

### Stony Brook University

Stony Brook, NY, US

POSTDOCTORAL ASSOCIATE

Nov. 2021 – Nov. 2023

- Conducted multi-year data analysis of neutrino sources using cascade event data from the IceCube Neutrino Observatory, leveraging Boosted Decision Trees (BDTs) for advanced data modeling and classification
- Utilized Python DataFrames and HDF5 format for efficient data manipulation, analysis, and storage, along with creating detailed visualizations and plots for insightful data representation.
- Collaborated with a multidisciplinary team, contributing to innovative research in particle astrophysics.

### Mohammed V University

Rabat, Morocco

DOCTORATE (PHD) IN HIGH ENERGY PHYSICS & DATA ANALYSIS

Nov. 2016 – Jun 2021

- Designed and implemented complex data analysis pipelines using large-scale datasets from the ATLAS detector.
- Developed and optimized statistical models for signal extraction and uncertainty quantification.
- Utilized advanced machine learning techniques for pattern recognition and particle identification (keras, DNN).
- Extensive experience with Python, ROOT, and other high-performance computing tools

## Education

### Faculty of sciences, Mohammed V University

Rabat, Morocco

PHD HIGH ENERGY PHYSICS ATLAS EXPERIMENT

Nov. 2016 – Jun. 2021

- Thesis: Observation of light-by-light scattering in heavy-ion collisions with the ATLAS detector at the LHC.
- Relevant skills: Large scale data analysis, statistical modeling, machine learning.

### Faculty of sciences, Mohammed I University

Oujda, Morocco

MASTER OF SCIENCE IN PHYSICS OF MATTER AND RADIATION

Nov. 2014 – Jun 2016

- Developed strong analytical, statistical, and programming skills during coursework and research.
- Relevant skills: Python programming, data analysis.

### Faculty of sciences, Mohammed I University

Oujda, Morocco

BACHELOR OF SCIENCE IN PHYSICS

Nov. 2011 – Jun 2014

## Skills

PROGRAMMING: C/C++, Python, SQL, Matlab, ~~LaTeX~~, JavaScript, Shell scripting

SOFTWARE AND TOOLS: Git, Jenkins, Bitbucket, Docker, OKD, Power BI, QlikView, SQLite, Microsoft Office, ROOT, Geant4, Origin

FRAMEWORKS & LIBRARIES: Flask, pyspark, pandas, numpy, scikit-learn, Django, ReactJS, ...

OPERATING SYSTEMS: Windows, Linux, macOS

MANAGEMENT: Web manager of ESMaR group

PERSONAL: Multitasking, organized, analytical mind ...



## Conferences, Presentations, and Trainings

### PyHEP workshop PyHEP2022

PARTICIPANT

- Python tools for data analysis in HEP .

Online

12-16 Sep 2022

### The fourth school on tools, techniques and methods for Computational and Data Science for High Energy Physics CoDaS-HEP

PARTICIPANT

- Large Data analysis technique and computing software .

Princeton, NJ, US

11-15 Oct 2021

### PyHEP workshop PyHEP2021

PARTICIPANT

- Python tools for data analysis in HEP .

Online

5-9 Jul 2021

### 12th International workshop on Multiple Partonic Interactions at the LHC: 12th MPI @ LHC

PRESENTER: JETS AND UPC PHYSICS IN HEAVY-ION COLLISIONS AT THE LHC

Online

11-15 Oct 2021

### The LXXI International conference, Nuclear physics and elementary particle physics. Nuclear physics technologies: NUCLEUS - 2021

PRESENTER: ULTRA-PERIPHERAL PHYSICS WITH ATLAS

Online

20-25 Sep 2021

### CERN-Fermilab Hadron Collider Physics Summer SchoolHCPSS 2019

PARTICIPANT (SCHOLARSHIP)

- Statistics + Machine Learning Lectures with Hands on Tutorials .

CERN, Geneva, Switzerland

28 Aug - 6 Sep 2019

### National Center for Physics (NCP), Islamabad, Pakistan School on LHC Physics

AWARDED 1ST PRIZE IN PRESENTATION COMPETITIONS

Islamabad, Pakistan

6-17 August 2018



## Publication

- Observation of Light-by-Light Scattering in Ultraperipheral Pb+Pb Collisions with the ATLAS Detector. [Phys-RevLett.123.052001](#).
- Measurement of light-by-light scattering and search for axion-like particles with 2.2 nb<sup>-1</sup> of Pb+Pb data with the ATLAS detector. [JHEP03\(2021\)243](#).
- Photon-photon physics at the LHC and laser beam experiments, present and future. [j.pnp.2021.103889](#).
- Search for invisible Higgs boson decays with vector boson fusion signatures with the ATLAS detector using an integrated luminosity of 139 fb<sup>-1</sup>. [JHEP08\(2022\)104](#).
- The Control Unit of the KM3NeT Data Acquisition System. [j.cpc.2020.107433](#).
- The KM3NeT multi-PMT optical module [JINST 17 \(2022\) 07, P07038](#).



## Languages

	ENGLISH		FRENCH		ARABIC (NATIVE)
Reading	●●●●●	Reading	●●●●●	Reading	●●●●●
Writing	●●●●○	Writing	●●●●○	Writing	●●●●●
Speaking	●●●●○	Speaking	●●●●●	Speaking	●●●●●
Listening	●●●●●	Listening	●●●●●	Listening	●●●●●



## Interests

SPORTS: Football , Hiking , Camping , Skiing...

ARTS: Photography , Cinema.

MISC: Traveling , Reading , Ex member of Moroccan association for development action (AMAD) .