

Helena Lefebvre, PhD

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EDUCATION

Royal Holloway, University of London, Egham, UK

PhD in Accelerator Physics

Thesis title: Machine-induced background of the ATLAS, CMS and FASER experiments

April 2023

McGill University, Montreal, Quebec, Canada

Master of Science in Physics

Thesis title: Monitoring Beam Backgrounds at Belle II with Scintillator Detectors

October 2017

University of Cincinnati, Cincinnati, Ohio, USA

Bachelor of Science in Physics

Bachelor of Science in Mathematics

April 2015

April 2015

EXPERIENCE

Postdoctoral Fellowship

Aug2024 – present

ELI Beamlines, Dolni Brezany, Czechia

- Physics For Future fellowship, MSCA COFUND
- Using Monte Carlo techniques used to simulate the propagation of secondary radiation around the laser-plasma accelerator ELIMAIA/ELIMED beamline
- Developing detection system for stray radiation around the beamline

PhD Thesis Project

Sep 2017 – Apr 2023

Royal Holloway University of London, Egham, UK; CERN, Geneva, Switzerland

- Developed Monte Carlo techniques used to simulate the propagation of accelerator-induced background radiation to the sensitive areas of particle physics experiments
- Estimated the levels of background radiation to the ATLAS and FASER experiments
- Contributed to design reports of ATLAS HGTD (High Granularity Timing Detector), FASER experiment and HE-LHC accelerator
- Participated in beam tests of detector components

Master Thesis Project

Sep 2015 - Aug 2017

McGill University, Montreal, Canada; KEK, Tsukuba, Japan

- Participated in the Belle2 experiment beam background monitoring project (in Japan during summer 2016)
- Characterization and assembly of scintillation detectors
- Development of Monte Carlo simulation for detector development and beam background estimation
- Worked on geometry update for final focusing magnets (QCS) from technical drawings

Student Internship

Jul 2015 - Aug 2015

Charles University, Prague, Czech Republic

- Participated in the Belle2 experiment
- Characterization of charge cluster shapes and detector response for DEPFET pixel sensors
- Contributed to implementing software tools for hit shape recognition

Internship for American and Italian physics students

Jun 2014 - Aug 2014

INFN, Cagliari, Italy

- Participated in INFN exchange summer student program
- Conducted a research project with the LHCb collaboration - Search for the X_b state
- Inspected different Upsilon(nS) final states to adjust X_b trigger preselection
- Wrote a LHCb internal analysis note

Woman in Science and Engineering Student Internship (WISE) Jun 2013 - Aug 2013
CERN, Geneva, Switzerland

- Participated in the LHCb experiment - Precise mass measurement of the Ξ_c baryon
- Improved the world's mass error for the mass of the Ξ particle
- Identified mass-momentum dependence as a significant problem
- Attended summer student lectures at CERN

Student Internship / Research position Jun 2012 - Aug 2012
Institute of Physics, Prague, Czech Republic

- Participated in experiments on the large laser facility PALS (Prague Asterix Laser System)
- Worked on target experiments in femtosecond interferometry
- Coordinated daily runs and security processes
- Assisted with preparation of optics for different projects

TALKS AND PUBLICATIONS

International Conference on High Energy Physics Aug 2020
Machine Detector Interface for FASER

John Addams Institute Fest Dec 2019
FASER Simulations: Particle Propagation In and Out of an Accelerator

Canadian Association of Physicists Congress May 2017
Monitoring Beam Backgrounds at Belle II with Scintillator Detectors

University of Cincinnati High Energy Seminar Oct 2016
Measuring the Beam Backgrounds at Belle II with Plastic Scintillators and LYSO Crystals

Full list of publications at ORCID: [0000-0002-7394-2408](https://orcid.org/0000-0002-7394-2408)
Active author of the ATLAS and FASER collaborations

SKILLS

Computer

CERN Root, C++, Python, Latex, Geant4, BDSIM, Madx, HTML, AutoCAD, Inventor, Inkscape, Mathematica, Microsoft Office

Language

Written and oral proficiency in English, French and Czech (mother tongue)

TRAININGS

John Addams Institute (JAI) accelerator courses Oct 2017 – May 2018
Intelligent Controls for Particle Accelerators Jan 2018
CERN Accelerator School (CAS) advanced summer school Sep 2017
CERN summer student lectures Jun 2013 - Aug 2013

ACTIVITIES AND AFFILIATIONS

Soapbox Science participant and volunteer Sep 2017 – Apr 2023
Zeptej se vědce outreach program
Organization of departmental journal club

McGill Woman in Physics committee Sep 2015 – Aug 2017
McGill open house volunteer
Participant in Physics Mentorship program

University of Cincinnati Varsity Swim Team

CSCAA Scholar All-America Honor

Society of Physics Students

University of Cincinnati Basics Utility Vehicle club (President 2014-15)

Sep 2011 – Apr 2015