

KEVIN THIEME

Postdoctoral Researcher in Experimental Astroparticle Physics

ADDRESS: University of Oxford, Department of Physics WEBSITES: physics.ox.ac.uk/our-people/thieme
Denys Wilkinson Building (Office 504A) wolfson.ox.ac.uk/person/kevin-thieme
Keble Road, Oxford, OX1 3RH, UK ORCID: [0000-0003-3954-7612](https://orcid.org/0000-0003-3954-7612)
EMAIL: kevin.thieme@physics.ox.ac.uk CITIZENSHIP: German

POSTDOCTORAL APPOINTMENTS

APR. 2025–TODAY **Research Assistant**, UNIVERSITY OF OXFORD, DEPARTMENT OF PHYSICS, UK
Supervisors: KIMBERLY PALLADINO, HANS KRAUS
Junior Research Fellow, WOLFSON COLLEGE, Oxford, UK (since Jan. 2026)
Collaborations: LUX-ZEPLIN (LZ), XLZD and MIGDAL

JAN. 2022–APR. 2025 **Research Fellow/Associate**, UNIVERSITY OF HAWAI‘I AT MĀNOA, DEPARTMENT OF
PHYSICS AND ASTRONOMY, USA
Supervisor: JELENA MARICIC
Associated Member, EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH (CERN),
Neutrino Platform, CH (host institute)
Supervisor: HANGUO WANG (UCLA)
Collaboration: DarkSide-20k – Co-leading WBS with GUILLAUME PLANTE (COLUMBIA)

EDUCATION

NOV. 2017–DEC. 2021 **Dr. sc. nat.**, UNIVERSITY OF ZURICH, DEPARTMENT OF PHYSICS, CH
PhD thesis: *The Low-Energy and Large-Scale Frontier of Dual-Phase Xenon Time Projection Chambers for Dark Matter Search* (with distinction, Faculty of Science)
Advisor and committee chair: LAURA BAUDIS
Committee: PATRICIA SÁNCHEZ-LUCAS, MARC SCHUMANN, NICOLA SERRA
Collaboration: DARWIN

SEP. 2015–JUN. 2017 **MSc. ETH Physics**, ETH ZURICH, DEPARTMENT OF PHYSICS, CH
Master thesis: *Null Lagrangians and Noether’s theorem for non-local field theories*
Advisors: NIKLAS BEISERT, DANIELE ORITI, ALEXANDER KEGELES

SEP. 2012–SEP. 2015 **BSc. ETH Physics**, ETH ZURICH, DEPARTMENT OF PHYSICS, CH
Semester thesis: *Vibration measurement at the PSI nEDM-experiment*
Advisors: KLAUS STEFAN KIRCH, SYBILLE KOMPOSCH, JOCHEN KREMPEL

JUN. 2012 **University entrance diploma**, GYMNASIUM COSWIG, GER
(with distinction, Saxon Minister of Education)

RESEARCH STAYS

APR. 2023–MAR. 2025 INFN LABORATORI NAZIONALI DEL GRAN SASSO (LNGS), IT (2 months total)

JAN. 2020 InvisiblesPlus Secondment at COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK, DE-
PARTMENT OF PHYSICS, USA (ELENA APRILE’s group)

SEP. 2016–APR. 2017 Master project at MAX PLANCK INSTITUTE FOR GRAVITATIONAL PHYSICS (AEI POTSDAM), GER (Division Quantum Gravity and Unified Theories, group for Microscopic Quantum Structure and Dynamics of Spacetime)

FEB. 2015–JUN. 2015 Semester project at PAUL SCHERRER INSTITUTE (PSI), CH (Division Research with Neutrons and Muons, group for Ultra Cold Neutron Physics)

RESEARCH EXPERIENCE

POSTDOCTORAL PROJECTS

2. Postdoc: As part of a UK pre-construction project I am leading the technical aspects of the field cage design of the next-generation rare event observatory [XLZD](#) which will deploy a 60 t to 80 t liquid xenon target.

FIELD CAGE DEVELOPMENT FOR XLZD

- Development and testing of novel field cage and TPC concepts, including fibre-composite material structures
- Electric field simulations with COMSOL
- Radiogenic background estimation and material selection

I am also working on a high-energy electronic recoil analysis of [LZ](#) data, and I am working on the data acquisition system of the [MIGDAL](#) experiment at the Rutherford Appleton Laboratory (RAL).

1. Postdoc: I played a substantial role in advancing the development of the dark matter detector [DarkSide-20k](#) which will deploy a 50 t low-radioactivity liquid argon target in a dual-phase TPC. As deputy manager of the Underground Argon Cryogenics System, I was responsible for its benchmarking and preparation for a mock-up detector test at INFN LNGS and co-led the design and planning process for its integration in DarkSide-20k. I was further involved in design and simulation efforts for the DarkSide-20k inner detector and the DarkSide-20k mock-up detector.

UNDERGROUND ARGON CRYOGENICS OF DARKSIDE-20K

- Lead of the installation and benchmarking of the cryogenics system for mock-up test at LNGS
- Major involvement in the commissioning of the cryogenics system (RE37) at CERN
- System design: operating modes, functional logic, piping & instrumentation diagram

INNER DETECTOR OF DARKSIDE-20K

- Design and testing of a capacitive level meter, liquid level control system and camera assembly for use in cryogenic environments for the DarkSide-20k mock-up detector
- Responsible for gas pocket formation and monitoring system of DarkSide-20k TPC
- Flow and thermal modelling of the argon volume in the DarkSide-20k TPC with CFD software ANSYS Fluent

At CERN, I was also involved in R&D on a PEN-based wavelength shifting reflector and in ProtoDUNE-HD (NP04).

DOCTORAL PROJECTS

In the context of the ERC-funded project [XENOSCOPE](#), I was studying the physics of low-energy interactions in liquid xenon and conducting detector and photosensor R&D towards the next-generation dark matter observatory [DARWIN](#), a dual-phase TPC with a 40 t liquid xenon target.

VERTICAL DARWIN DEMONSTRATOR

- Major involvement in the development of a 2.6 m tall prototype dual-phase xenon TPC with 350 kg xenon
- Leading role in the successful commissioning phase and the first run
- Design and installation of the following subsystems: horizontal levelling system, heat exchangers, filtration and safety recuperation gas system, two independent xenon storage and recovery systems (gas and liquid), including 385 l pressure vessel with 90 bar rating
- Horizontal levelling system is a registered German utility model ([DE 20 2021 101 412 U1](#))

MICROPHYSICS MEASUREMENTS AT LOW ENERGIES AND NOVEL PHOTSENSORS

- Operation of the first dual-phase xenon TPC with SiPMs and characterisation with internal ^{37}Ar and $^{83\text{m}}\text{Kr}$ sources down to its energy threshold
- Measurement of the mean electronic excitation energy of liquid xenon (W-value) with calibration data and single-electron events

- Development and implementation of an efficient raw-data processing framework in C++ and ROOT for dual-phase xenon TPC with hybrid photosensor readout (SiPM/PMT)
- Design and assembly of a source insertion system for gaseous ^{37}Ar into a TPC gas system and source production in collaboration with the Laboratory for Radiochemistry at SINQ (PSI)
- Optical simulations with GEANT4 and search for external double photoelectron emission in SiPMs

TEACHING AND SUPERVISION EXPERIENCE

- Teaching assistant for courses on experimental physics I – IV for physics majors (4 semesters at Zurich)
- Demonstrator for laboratory courses for physics majors and veterinary medicine students (2 semesters at Zurich and 1 term at Oxford)
- Advisor for:
 - PhD students: P. SALOMONE (SAPIENZA U. ROME) at LNGS, V. GOICOECHEA CASANUEVA (U. HAWAII)
 - Master students: N. SCHERMER (TU MUNICH) during semester project at Zurich, P. SALOMONE (SAPIENZA U. ROME) at CERN, T. WONG (U. OXFORD)
 - Bachelor/undergraduate students: S. HOCHREIN (U. ZURICH), summer students (WILLIAMS COLLEGE) at LNGS, B. KAVANAGH and L. HABGOOD (U. OXFORD), K. MCKENNA (U. MANCHESTER) during summer internship at Oxford

CONFERENCES, WORKSHOPS AND SEMINARS

- 21–22 OCT. 2025: UK HEP FORUM 2025: “WANDERING IN THE DARK”, Participant, Abingdon, UK
- 8–12 JULY 2024: IDM 2024, [Poster](#), L’Aquila, IT
- 23–26 MAY 2022: XESAT2022, [Talk](#), University of Coimbra, PT
- 1 FEB. 2022: XENON/DARWIN SCIENCE CLUB, *A Measurement of the Mean Electronic Excitation Energy of Liquid Xenon*, online
- 8 OCT. 2021: INPA SEMINAR (LBNL Berkeley), [Talk](#), invited, online
- 12–23 JUL. 2021: ICRC 2021, [Talk](#), online, proceedings: [PoS\(ICRC2021\)](#)
- 28–30 AUG. 2019: LIDINE 2019, [Talk](#), University of Manchester, UK
- 26–30 AUG. 2019: SPS-ÖPG ANNUAL MEETING, [Talk](#), University of Zurich, CH
- 10–17 JUL. 2019: EPS-HEP2019, [Talk](#), ICC & Ghent University, BE
- 9–11 JAN. 2019: ZPW2019, A NEW LOOK AT DARK MATTER, Participant, University of Zurich, CH
- 21–22 JUN. 2018: SENSE TECHFORUM, Poster: *Characterization of SiPMs for Use in Liquid Xenon Time Projection Chambers*, University of Geneva, CH

OUTREACH

- Event lead for [DARK MATTER DAY 2025](#) at the University of Oxford, organising flash talks, a poster session, particle physics demonstrations, and children’s science activities for an audience of over 100 members of the public.
- Public talk and lab tour at the largest Swiss Science Festival SCIENTIFICA 2021.

IT SKILLS

- PROGRAMMING: C/C++ (proficient), Python (proficient), LabVIEW (competent)
- ANALYSIS: ROOT (proficient)
- SIMULATION: ANSYS Fluent/Maxwell (expert), COMSOL Multiphysics AC/DC Module (proficient), GEANT4 (advanced beginner)
- CAD: SolidWorks (expert)
- TYPESETTING: LaTeX (proficient)

LANGUAGES

ENGLISH: Fluent GERMAN: Mother tongue FRENCH: Basic knowledge

MISCELLANEOUS

- Referee for European Physical Journal C and Journal of Instrumentation
- Soaring since 2008 (Glider Pilot License in 2010), duty as flight controller on glider airfield
- Tea Sommelier (Berlin Tea Academy Certificate 2024)