

Dr Alexander Deisting

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Employment

PRDA, Johannes Gutenberg-Universität Mainz

Mainz, DE

Group of Uwe Oberlack; R&D of new electrodes for future dual-phase Xe time projection chambers (TPCs); Upgrade of the MainzTPC with SiPMs; Maintenance of the neutron veto of the XENONnT observatory; Simulations for future single-phase noble liquid detectors.

May. 2022 - today

PRDA, Royal Holloway University of London

London, UK

Group of Jocelyn Monroe; R&D on high pressure TPCs with optical readout and hybrid charge and optical readout, Tests of TPC hardware for their suitability as parts of future DUNE near detector high pressure gas TPC; Development of a novel, low cost sensor to detect lead in drinking water

Aug. 2018 - Apr. 2022

PDRA, Gesellschaft für Schwerionenforschung / Ruprecht-Karls-Universität Heidelberg

Darmstadt, DE / Heidelberg, DE

Group of Silvia Masciocchi; Discharge studies with gas electron multiplier (GEMs) foils; Commissioning of the GEM testing facilities for the ALICE TPC's GEMs mass production

Mar. 2028 - Jul. 2018

Education

Ruprecht-Karls-Universität Heidelberg (Heidelberg, DE / CERN, CH)

[[10.11588/heidok.00024133](https://doi.org/10.11588/heidok.00024133)]

Dr. rer. nat. (Physics); Thesis title: "Measurements of ion mobility and GEM discharge studies for the upgrade of the ALICE time projection chamber", Supervisor: Prof. Dr. S. Masciocchi

Aug. 2014 - Feb. 2018

Rheinische Friedrich-Wilhelms-Universität Bonn (Bonn, DE)

[[BONN-IB-2014-10](https://doi.org/10.11588/bonn-ib-2014-10)]

Master of Science in Physics; Thesis title: "Readout and Analysis of the Induced Ion Signal of an InGrid Detector", Supervisor: Prof. Dr. K. Desch

Oct. 2012 - May. 2014

Rheinische Friedrich-Wilhelms-Universität Bonn (Bonn, DE)

[[2012-02](https://doi.org/10.11588/2012-02)]

Bachelor of Science in Physics; Thesis title: "Reconstruction of charge depositions due to primary electrons in a GEM-Pixel-TPC with an algorithm used for applications in astrophysics" (translation, the thesis is written in German with the title: "Rekonstruktionen von Ladungsdepositionen in einer GEM-Pixel-TPC mit einem Algorithmus aus der Astronomie"), Supervisor: Prof. Dr. K. Desch

Oct. 2008 - Sept. 2012

Leadership positions and committee work

Darwin collaboration

[[Darwin](#)]

Co-lead of the Darwin WG6: "LXe Properties and Calibration" together with R. Budnik, Weizmann Institute of Science

May. 2023 - today

ECFA DRD2: "Liquid detectors collaboration"

[[ECFA DRD2 Indico](#)]

Co-lead of the task "Amplification structures, charge-to-light conversion and granular light readout of dual phase detectors" together with K. Mavrokoridis, University of Liverpool

Nov. 2022 - today

AIDAInnova, Work package 7

[[e.g. AIDAInnova Indico](#)]

Lead of Task 4.2: "A high pressure gas time projection chamber with optical readout for neutrino physics"

2021 - 2022

2019 - 2020: Lead of the task: "Hybrid readout high pressure gas TPC for neutrino physics" during the AIDAInnova proposal preparations

(INFRAINNOV-04-2020) [[AIDAInnova](#)]

"PlomBox: a Device for Open-Source Metrology to Fight Lead Contamination in Drinking Water"

[[EP/T015586/1, PlomBox](#)]

Work package coordinator: "Mobile Phone Data Acquisition"; Leading the development of a mobile phone controlled DAQ system, and of the analysis server set-up for the future PlomBox devices

2020 - 2022

DUNE near detector high pressure gas TPC development

Leading the tests of an ALICE outer readout chamber to assert its suitability for high pressure operation in the UK

2019 - 2022

Development of a high pressure gas time projection chamber with hybrid charge and optical readout

Co-leading the research effort with the 1 m³ high pressure gas TPC prototype

2018 - 2022

“Materia Oscura: Instrumentation Development to Observe the Invisible”

[[ST/R002908/1](#)]

Leading the research exploring lead detection in drinking water using CMOS sensors

2018 - 2020

Grants and Funding Awards

STFC Early Technology Development Capital Funding

152 000 £; [[ST/W005727/1](#)]

“Infrastructure Request for High Pressure Gas TPC Development Studies for the DUNE Near Detector”, together with G. Barker, X. Lu, University of Warwick

2022

AIDIAinnova

66 666 £

European Union’s Horizon 2020 Research and Innovation programme under Grant Agreement No 101004761. Funding secured at Royal Holloway University of London (*cf.* Leadership and committee work: AIDIAinnova proposal preparations)

2021

Royal Holloway, University of London, *Strategic knowledge exchange grant*

20 000 £

Project title: “Explore the commercialisation of a device with a CMOS sensor at its heart for dosimetry applications”

2020

Nuclear Security Sciences Network, Personal Development Grant

1 000 £

Funding to visit the 2020 IEEE in Manchester

2019

Collaborations

XENONnT

Maintenance of the neutron veto, development of new electrodes

May 2022 - today

Darwin

WG6 working group co-leader (*cf.* Leadership and committee work: Darwin), concept studies of single-phase liquid xenon TPCs, development of electrode assay techniques

May 2022 - today

ARIADNE+

DAQ control GUI development and contributions to the assembly of the light readout plane of the 2 × 2 m² demonstrator of TimePix3 readout of a dual-phase argon TPC

2022

DUNE

Near detector high pressure gas TPC development

2019 - today

ALICE and ALICE TPC upgrade collaboration

PhD thesis experiment (*cf.* Education), Development of new readout chambers allowing for continuous readout of the ALICE TPC, on-site ALICE TPC expert, beam-test coordination

2014 - 2018

Publications

Selected journal papers

For these publications I am the lead- and corresponding author, the first author is indicated in bold. I had critical contributions to the development of the measurement, the commissioning of the set-up, the data taking, the analysis, the paper writing, and the organisation of the internal review processes of these publications.

- [1] **A. Deisting**. “Commissioning of a hybrid readout TPC test set-up and gas gain simulations”, *J. Phys.: Conf. Ser.* 2374 012145; DOI: [[10.1088/1742-6596/2374/1/012145](#)], arXiv: [[2201.02464](#)]
- [2] **A. Deisting**, *et al.* “Commissioning of a High Pressure Time Projection Chamber with Optical Readout”, *Instruments* 2021, 5(2), 22; DOI: [[10.3390/instruments5020022](#)]
- [3] **A. Aguilar-Arevalo**, *et al.* “Dosimetry and Calorimetry Performance of a Scientific CMOS Camera for Environmental Monitoring”, *Sensors* 2020, 20(20), 5746; DOI: [[10.3390/s20205746](#)], arXiv: [[2009.11227](#)]

- [4] **A. Deisting**, *et al.* “Secondary discharge studies in single and multi GEM structures”, *NIM A*, 2019, 937, pp. 168-180; DOI: [10.1016/j.nima.2019.05.057], arXiv: [1901.06035]
- [5] **A. Deisting** for the HPTPC working groups. “Commissioning and beam test of a high pressure time projection chamber”, *NIM A*, 2020, 958, pp. 162153; DOI: [10.1016/j.nima.2019.04.107]
- [6] **A. Deisting**, C. Garabatos and A. Szabo. “Ion mobility measurements in Ar-CO₂, Ne-CO₂, and Ne-CO₂-N₂ mixtures, and the effect of water contents”, *NIM A*, 2018, 904, pp. 1-8; DOI: [10.1016/j.nima.2018.07.008], arXiv: [1804.10288]
- [7] **A. Deisting** and C. Garabatos. “Discharge and stability studies for the new readout chambers of the upgraded ALICE TPC”, *2017 JINST 12 C05017*; DOI: [10.1088/1748-0221/12/05/C05017], arXiv: [1705.02150]
- [8] **A. Deisting**, C. Garabatos, A. Szabo and D. Vranic. “Measurements of ion mobility in argon and neon based gas mixtures”, *NIM A*, 2017, 845, pp. 215-217; DOI: [10.1016/j.nima.2016.06.093], arXiv: [1603.07638]
- [9] **A. Deisting** for the ALICE collaboration. “Status of the R&D activities for the upgrade of the ALICE TPC”, *EPJ Web Conf.* 174 (2018) 01006; DOI: [10.1051/epjconf/201817401006], arXiv: [1601.02183]

Selected co-authored publications and reports

- [10] **A. Ritchie-Yates**, *et al.* “First operation of an ALICE OROC operated in high pressure Ar-CO₂ and Ar-CH₄”, *Eur. Phys. J. C* 83, 1139 (2023); DOI: [10.1140/epjc/s10052-023-12297-x], arXiv: [2305.08822];
Critical contributions to the development of the measurement, the commissioning of the set-up, the data taking, the analysis, the paper writing, and the organisation of the internal review processes. The first and corresponding author is a PhD student whom I supervised in the laboratory.
- [11] **A. Lowe**, *et al.* “ARIADNE⁺: Large scale demonstration of fast optical readout for dual-phase LArTPCs at the CERN Neutrino Platform” *Phys. Sci. Forum* 2023 8(1) 46; DOI: [10.3390/psf2023008046], arXiv: [2301.02530];
Contributions to the commissioning of the set-up, and the internal review processes.
- [12] **A. Aguilar-Arevalo**, *et al.* “Volume reduction of water samples to increase sensitivity for radioassay of lead contamination”, *Appl Water Sci* 12, 151 (2022); DOI: [10.1007/s13201-022-01669-5], arXiv: [2205.04147];
Critical contributions to the development of the measurement, and the internal review processes. The lead and corresponding author is a PhD student (A. Dias) whom I co-supervised.
- [13] **The DUNE collaboration**. “A Gaseous Argon-Based Near Detector to Enhance the Physics Capabilities of DUNE” *2022 Snowmass Summer Study*; arXiv: [2203.06281];
Contributions to the planning discussions for the report and the internal review processes.
- [14] **A. Aguilar-Arevalo**, *et al.* “PlomBOX – development of a low-cost CMOS device for environmental monitoring” *Contribution to CEST 2021*; arXiv: [2201.03348];
Co-coordinator of the research effort, critical contributions to the development of the methodology, the analysis framework and the internal review processes. The lead and corresponding author is a PhD student (A. Dias) whom I co-supervised.
- [15] **J. Adolfsson**, *et al.* “The upgrade of the ALICE TPC with GEMs and continuous readout”, *2021 JINST 16 P03022*; DOI: [10.1088/1748-0221/16/03/p03022], arXiv: [2012.09518];
Critical contributions to the development of some of the measurements within (and the corresponding commissioning of small scale set-ups, data taking, and analysis) as well as the organisation of beam times. Contributions to the general reported hardware development and the internal review processes.
- [16] **S. B. Jones**, *et al.* “Off-Axis Characterisation of the CERN T10 Beam for low Momentum Proton Measurements with a High Pressure Gas Time Projection Chamber”, *Instruments* 2020, 4(3), 21; DOI: [10.3390/instruments4030021], arXiv: [2007.15609];
Critical contributions to the detector commissioning, the data taking, the development of the analysis framework and the internal review process
- [17] **A. V. Waldron**, A. Deisting. “A High Pressure TPC with Optical Readout”, *2019 IEEE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC)* pp. 1-2; DOI: [10.1109/NSS/MIC42101.2019.9059848];
Critical contributions to the development of the measurement, the commissioning of the set-up, the data taking, the analysis, and the internal review processes.
- [18] **A. Mathis** for the ALICE TPC Upgrade collaboration. “Particle identification studies with a full-size 4-GEM prototype for the ALICE TPC upgrade”, *NIM A*, 2018, 903 pp. 215-223; DOI: [10.1016/j.nima.2018.06.084], arXiv: [1805.03234];
Critical contributions to the organisation of the test beam and the data taking. Contributions to the planning discussions and the internal review process.
- [19] **The ALICE Collaboration**. “Addendum to the Technical Design Report for the Upgrade of the ALICE Time Projection Chamber”, *ALICE-TDR-016-ADD-1*; CDS: [CERN-LHCC-2015-002]
Critical contributions to the organisation of the test beams, the data taking, smaller experiments in the lab as well as the data analysis for test-beams and small prototypes.

Talks, seminars and posters

- Invited talk** “Lessons learned from current gas TPCs”, *DUNE Near Detector Phase II workshop* (2023), [Indico]
- Conference talk** “A high resolution scanning set-up for defect detection on electrodes”, *XeSAT2023* (2023), [Indico]
- Conference talk** “A high resolution scanning set-up for defect detection on electrodes”, *DPG-Frühjahrstagung SMuK* (2023),
[Book of abstracts]
- Conference talk** “Optical TPC: current and future developments”, *New Horizons in Time Projection Chambers* (2020), [Indico]

- Conference talk** “Commissioning and beam test of a high pressure time projection chamber”, *15th Vienna conference on Instrumentation* (2019), [[Indico](#)]
- Invited talk** “Secondary discharge phenomena in GEM detectors”, Overview talk for the ALICE TPC Upgrade Collaboration, *MPGD stability work-shop* (2018), [[Indico](#)]
- Group report** “Towards the mass production of readout chambers for the upgrade of the ALICE TPC”, *DPG-Frühjahrestagung, Hadronen und Kerne* (2017), [[Book of abstracts](#)]
- Conference talk** “Discharge and stability studies for the readout chambers of the upgraded ALICE TPC”, *International Conference on Instrumentation for Colliding Beam Physics (INSTR17)* (2017), [[Indico](#)]
- Conference talk** “Measurements of ion mobility in argon- and neon-based gas mixtures”, *DPG-Frühjahrestagung, Hadronen und Kerne* (2016), [[Book of abstracts](#)]
- Conference talk** “Status of the R&D activities for the upgrade of the ALICE TPC” *MPGD – 4th Conference on Micro-Pattern Gaseous Detectors* (2015), [[Indico](#)]
- Conference talk** “Untersuchung des induzierten Ionen-Signales bei Gasverstärkung von Elektronen mit Hilfe eines InGrid”, *DPG-Frühjahrestagung, Teilchenphysik* (2014), [[Book of abstracts](#)]
- Seminar** “Towards the next xenon filled dark matter experiment”, *EMMI Nuclear and Quark Matter Seminar* (2023)
- Seminar** “A gas TPC for neutrino physics”, *ETAP Seminar at University of Mainz* (2022)
- Seminar** “Under pressure: A Time Projection Chamber for neutrino interaction measurements”, *High energy physics seminar at Technische Universität München* (2019), Munich (DE)
- Seminar** “The ALICE Time Projection Chamber and its upgrade” *Particle Physics Seminar at Imperial College London* (2019)
- Seminar** “Taking a Time Projection Chamber to high pressure” *High energy physics seminar at the University College London* (2018)
- Seminar** “The ALICE Time Projection Chamber and its upgrade” *Particle Physics Seminar at the Royal Holloway University London* (2018)
- Poster** “A hybrid high pressure time projection chamber for neutrino experiments”, *TIPP 2021 International Conference on Technology and Instrumentation in Particle Physics* (2021), [[Indico](#)]
- Poster** “Towards a low cost lead assay technique for drinking water using CMOS sensors” *2019 IEEE Nuclear Science Symposium and Medical Imaging Conference* (2019), [[Conference web page](#)]
- Poster** “Measurement of ion mobility in Argon and Neon based gas mixtures”, *14th Vienna conference on Instrumentation* (2016), [[Indico](#)]
- Talk** “Electrodes status” *XENONnT collaboration meeting, Paris* (2023)
- Talk** “Mainz Optical Scan Facility” *XENONnT collaboration meeting, L’Aquila* (2023)
- Talk** “OROC test stand and testing at RHUL & Imperial College London”, *6th DUNE near detector workshop* (2019), [[Indico](#)]
- Talk** “Progress on outer Readout chamber testing at Royal Holloway, University of London & Imperial College London”, *DUNE collaboration meeting* (2020)
- Talk** “Discharge studies with single GEMs” *RD51 mini week* (2016)
- Talk** “Measurements of ion mobility in argon- and neon-based gas mixtures”, *RD51 collaboration meeting* (2016)
- Talk** “Discharge studies with an inner readout chamber prototype”, *DPG-Frühjahrestagung, Hadronen und Kerne* (2015), [[Book of abstracts](#)]
- Talk** “ALICE setup in H4: Stability measurement of readout chamber prototype for the ALICE TPC”, *RD51 mini week* (2014)
- Talk** “Status of the ALICE TPC upgrade and beam-time prospects”, *14th RD51 collaboration meeting* (2014)

Supervised students

The following list shows all Bachelor (3 to 6 months), Master (one year) and doctoral (3.5 years+) students have supervised. In addition I list “Summer placements”, students I supervised during their ~6 weeks internship in our research group. “Lab supervisor” refers to students who I was not the official supervisor of, but who I supervised during the bulk of their research work. Abbreviations: JGU – Johannes Gutenberg-Universität Mainz (DE), Royal Holloway, University of London (GB) – RHUL, University of Heidelberg (DE) – HD.

Constantin Szyszka, Master of Science (Supervisor) Re-commissioning and upgrade of the MainzTPC (preliminary)	<i>JGU</i> 2022 - today
Shumit Arumoy Mitra, Bachelor of Science (Supervisor) Corona Discharge as a Tool for Identifying Thin Wire Surface Irregularities	<i>JGU</i> 2022 - 2023
Adriana Dias, PhD (Co-supervisor) Detector Development for Particle Physics and Applications to Environmental Monitoring (preliminary)	<i>RHUL</i> 2019 - 2022
Ash Ritchie-Yates, PhD (Lab supervisor) Development of readout structures for high pressure gas time projection chambers (preliminary)	<i>RHUL</i> 2019 - 2022
Joshua Eeles, Master by Research (Supervisor) Commissioning and Operating an OROC based High Pressure Time Projection Chamber	<i>RHUL</i> 2020 - 2021
Asim Aslam, Summer placement (Supervisor) A gaseous proportional counter built from a conventional aluminium beverage can (Essentially doing this: arXiv:1509.02379)	<i>RHUL</i> 2021
Annora Sundararajan, Bachelor of Science (Supervisor) Commissioning of a Camera System for the Optical Readout of a Time Projection Chamber	<i>RHUL</i> 2019 - 2020
Adam Tarrant, Master by Research (Supervisor) Development of Gas Electron Multipliers for hybrid-readout gaseous Time Projection Chambers in Future Neutrino Experiments	<i>RHUL</i> 2019 - 2020
Matthew Loxton, Bachelor of Science (Supervisor) Simulation of Electroluminescence in Nobel Gases at Different Pressures for Gaseous Detectors with Optical Read-out	<i>RHUL</i> 2018 - 2019
Bogdan Mihail Blidaru, Master of Science (Lab supervisor) Discharge propagation in double-GEM detectors	<i>HD</i> 2017 - 2018
Alexandra Datz, Bachelor of Science (Lab supervisor) Studies on Secondary Discharges and their Mitigation with a two GEM Detector	<i>HD</i> 2016 - 2017

Lecture course contributions and teaching assistant roles

Astroparticle Physics Masters course, contributing lectures as substitute	<i>JGU</i> 2023
Particle detectors Masters course, contributing lectures as substitute	<i>JGU</i> 2022
PH1920: Physics of the Universe Contributing all the astrophysics and cosmology lectures and exercises	<i>RHUL</i> 2022
PH3170/4170: C++ and Object Oriented Programming Contributing one lecture and supervising a third of the students on their final coding projects	<i>RHUL</i> 2021
PH1920: Physics of the Universe Contributing one astrophysics lecture and the corresponding exercises	<i>RHUL</i> 2021
PH3170/4170: C++ and Object Oriented Programming Contributing one lecture and supervising a third of the students on their final coding projects	<i>RHUL</i> 2020
PH1920: Physics of the Universe Contributing one astrophysics lecture and the corresponding exercises	<i>RHUL</i> 2020
PH1920: Physics of the Universe Contributing one astrophysics lecture and the corresponding exercises	<i>RHUL</i> 2019

Volunteer Services

In addition to the information listed above I occasionally review articles for JINST, NIM A, MDPI instruments and sensors and EPJC. I organised the seminars of the high energy physics group at Royal Holloway, University of London, from 2019 to 2022.

Outreach

Below a list of my outreach activities. In addition I occasionally showed visitors of the general public the ALICE experiment during my time at CERN. During my undergraduate at University of Bonn I participated in the “Physik show” (<https://www.physikshow.uni-bonn.de/>).

Pupils workshops on PMT operation

Measurements of Cherenkov radiation of a PMT immersed in water, simple data analysis with python

JGU
2022 - 2023

Outreach talk to pupils

“Dunkle Materie & das XENONnT Experiment” (“Dark Matter and the XENONnT experiment”), International Cosmic Day

JGU
2022

Girls into Physics

Lecture on detector development, Outreach event to inspire schoolkids to study physics after school.

RHUL
2021