

Dr. Markus Elsing

Senior Physicist • CERN

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Research Profile

Experimental high-energy physicist working on electroweak heavy-flavour physics, charged-particle tracking and reconstruction, the software and data systems that enable precision measurements at hadron colliders, and machine learning and data science. Research contributions span DELPHI at LEP and ATLAS at the LHC, including large-scale data processing systems, the Phase-2 Inner Tracker design and trigger software.

Appointments

CERN • Senior Physicist

Current

CERN career since 1996; ATLAS group leadership, 2002–2025

Group Leader, ATLAS Computing (2002–2008) and ATLAS Data Processing (2008–2021); Deputy Group Leader, ATLAS Data Processing (2022–2025). Coordinator, ATLAS Team Physics Group (2022–2026). Earlier CERN appointments included Research Fellow in DELPHI (1996–1998), Research Staff in DELPHI (1998–2001) and in the ATLAS Trigger Group (2001–2002).

Scientific Roles

- **Coordinator for the ATLAS work package**, CERN Next Generation Triggers project (since 2024).
- **Deputy Director**, CERN Schools of High-Energy Physics (since 2022).
- **Fellow**, European Coalition for AI in Fundamental Physics (since 2025).
- **Organiser**, CERN Data Science Seminars (since 2017); co-initiator, Connecting the Dots workshop series.
- **Editor-in-Chief**, EPJ C section for Computing, Software and Data Science (since 2025); former Editor-in-Chief, *Computing and Software for Big Science* (2016–2025).
- **Elected Member**, German Committee for Particle Physics (KET, 2015–2021).
- **Supervision and mentoring**: Supervision of students, postdocs and early-career scientists; responsible for staff career development as group leader.

Selected Scientific Contributions

- **Data science and machine learning**: Pioneered advanced machine learning and classical reconstruction techniques for offline reconstruction and trigger event selection.
- **ATLAS tracking and offline software**: Coordinated Inner Detector software project in preparation for the start of ATLAS data taking until the time of the Higgs discovery at the end of Run-1. As ATLAS Software Coordinator, led software development programmes in preparation for Run-2 data taking.
- **ATLAS trigger software and detector upgrade**: Led early High-Level Trigger framework design and prototype work; contributed to the Insertable B-Layer and led the Phase-2 Inner Tracker upgrade layout and performance studies and co-editor of the technical design reports.
- **Research computing**: Responsible for development and operation of ATLAS Tier-0 processing and the distributed data management systems, from DQ2 to Rucio. Contributed to the open source tracking software project ACTS.
- **LEP / DELPHI**: Heavy-flavour electroweak measurements at the Z pole and member of the LEP Electroweak Working Group. Coordination of tracking and energy-flow activities. Led a tracking-software redevelopment which after data reprocessing led to DELPHI precision measurement of R_b . Carried out the precision measurement of $A_{FB}(b)$ at the Z pole.

Education

PhD in Physics, University of Wuppertal, 1996. DELPHI experiment; thesis on charm- and bottom-quark forward-backward asymmetries near the Z resonance.

Diploma in Physics, University of Wuppertal, 1993. DELPHI experiment.

Research Record

Full publication record: INSPIRE-HEP author profile. Talks, publications and teaching: elsing.web.cern.ch.