

Curriculum Vitae

Personal Information

Name: Erik Bergbäck Knudsen

Born: February 6th, 1974, in Finspång, Sweden

Nationality: Danish

Address: Lystofte 10, DK-2740 Skovlunde, Denmark.

Civic status: Married, 3 children (8, 6, and 2 years old)

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Education

Jan. 2000 - May 2003 Ph.D., DTU, Denmark.

Supervisor: Anders Bjarklev

Sep. 1994 - Jan. 2000 M. Sc. E.E., LTH, Lund University, Sweden.

Aug. 1990 - Jun. 1993 High School, Bergska Skolans Gymnasium, Finspång, Sweden.

Experience

Apr. 2012 – present Research Engineer, DTU Physics

Jan 2016 – present, designing the DanMAX beamline at MAX-IV, Lund, Sweden.

Simulation software and algorithm development for X-rays and neutrons.

Jun. - Sep. 2012, development of a new polarizer for the SINQ at PSI, Switzerland.

Mar. 2009 - Apr. 2012 Researcher, DTU Physics.

McXtrace X-ray tracing software package, Funded by NaBiIT.

Mar. 2007 - Mar. 2009 Post. Doc., Materials Research Department, Risø DTU.

Polarized neutron ray tracing, Funded by ISIS TS2-project.

Mar. 2004 - Mar. 2007 Post. Doc., Materials Research Department, Risø DTU.

Reconstruction algorithms for X-ray diffraction data.

Scientific Interests

Statistical simulations of X-ray and neutron scattering experiments in general. For purposes of instrument optimization and design of new instrument concepts to be implemented at Large Scale Facilities, or for purposes of data-analysis. In particular; Partially coherent and/or polarized X-ray scattering experiment techniques and their applications and instrument development. X-ray and neutron imaging techniques.

Instrumentation for molecular (He, H₂) scattering and Instrumentation development in connection w. large scale X-ray and neutron facilities.

Responsibilities

Lead developer in the international team behind the McXtrace X-ray simulation software package

Member of the international governing body of the McStas neutron simulation software package, responsible for the polarization subsystem.

Responsible for simulation effort when designing DanMAX.

Teaching Experience

Virtual x-ray scattering as part of Solid State Physics Course at DTU.

Coordinator of the project course Future Trends in Photonics. Several years Teaching assistant in Neutron Scattering course at Copenhagen University and DTU.

Publication List for Erik Bergbäck Knudsen

Selected Refereed Journal Articles

- [1] S. D. Eder, A. K. Ravn, B. Samelin, G. Bracco, T. Reisinger, **Knudsen, E. B.**, K Lefmann and B Holst. “0-Order Filter for Diffractive Focusing of de Broglie Matter Waves”. In: *Physical Review A* (2016). in review.
- [3] Thomas Kittelmann, Esben Klinkby, **Knudsen, Erik B**, Peter Willendrup, Xiao Xiao Cai and Kalliopi Kanaki. “Monte Carlo Particle Lists: MCPL”. In: *arXiv preprint arXiv:1609.02792* (2016).
- [5] Ursula Bengaard Hansen, Mads Bertelsen, **Knudsen, Erik Bergbäck** and Kim Lefmann. “Simulation of waviness in neutron guides”. In: *Journal of Neutron Research* 18.2-3 (2015), pp. 45–59.
- [6] M Thomsen, **Knudsen, E B**, Peter Kjær Willendrup, Martin Bech, M Willner, F Pfeiffer, M Poulsen, Kim Lefmann and R Feidenhans. “Prediction of beam hardening artefacts in computed tomography using Monte Carlo simulations”. In: *Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms* 342 (2015), pp. 314–320.
- [7] Esben Bryndt Klinkby, **Knudsen, E B**, Peter Kjær Willendrup, Bent Lauritzen, Erik Nonbøl, Philip Bentley and Uwe Filges. “Application of the MCNPX-McStas interface for shielding calculations and guide design at ESS”. In: *Journal of Physics: Conference Series* 528.1 (2014), p. 012032.
- [9] Peter Kjær Willendrup, **Knudsen, E B**, E Klinkby, T Nielsen, Emmanuel Farhi, U Filges and Kim Lefmann. “New developments in the McStas neutron instrument simulation package”. In: *Journal of Physics: Conference Series* 528.1 (2014), p. 012035.
- [10] Peter Kjær Willendrup, Emmanuel Farhi, **Knudsen, E**, U Filges and Kim Lefmann. “McStas: Past, present and future”. In: *Journal of Neutron Research* 17.1 (2014), pp. 35–43.
- [11] **Bergbäck Knudsen, Erik**, A Trantum-Rømer, Peter Kjær Willendrup, P Christiansen and Kim Lefmann. “Investigation of propagation algorithms for ray-tracing simulation of polarized neutrons”. In: *Journal of Neutron Research* 17.1 (2014), pp. 27–34.
- [14] **Knudsen, Erik Bergbäck**, Esben Bryndt Klinkby and Peter Kjær Willendrup. “McStas event logger: Definition and applications”. In: *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment* 738 (2014), pp. 20–24.
- [17] Kim Lefmann, Kaspar H Klenø, Jonas Okkels Birk, Britt R Hansen, Sonja L Holm, **Knudsen, Erik**, Klaus Lieutenant, Lars Von Moos, Morten Sales, Peter K Willendrup et al. “Simulation of a suite of generic long-pulse neutron instruments to optimize the time structure of the European Spallation Source”. In: *Review of Scientific Instruments* 84.5 (2013), p. 055106.

- [18] **Bergbäck Knudsen, Erik**, Andrea Prodi, Jana Baltser, Maria Thomsen, P Kjær Willendrup, Manuel Sanchez Del Rio, Claudio Ferrero, Emmanuel Farhi, Kristoffer Haldrup, Anette Vickery et al. “McXtrace: a Monte Carlo software package for simulating X-ray optics, beamlines and experiments”. In: *Journal of Applied Crystallography* 46.3 (2013), pp. 679–696.
- [19] **Knudsen, Erik B**, Henning O Sørensen, Jonathan P Wright, Gaeel Goret and Jérôme Kieffer. “FabIO: easy access to two-dimensional X-ray detector images in Python”. In: *Journal of Applied Crystallography* 46.2 (2013), pp. 537–539.
- [21] Kaspar H Klenø, Peter K Willendrup, **Knudsen, Erik** and Kim Lefmann. “Eliminating line of sight in elliptic guides using gravitational curving”. In: *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment* 634.1 (2011), S100–S103.
- [23] Linda Udby, Peter Kjær Willendrup, **Knudsen, E**, Ch Niedermayer, U Filges, Niels Bech Christensen, E Farhi, BO Wells and Kim Lefmann. “Analysing neutron scattering data using McStas virtual experiments”. In: *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment* 634.1 (2011), S138–S143.
- [25] **Knudsen, Erik**, Linda Udby, Peter Kjær Willendrup, Kim Lefmann and WG Bouwman. “McStas-model of the delft SESANS”. In: *Physica B: Condensed Matter* 406.12 (2011), pp. 2361–2364.

Selected Refereed Conference Articles

- [2] Desiree Della Monica Ferreira, **Knudsen, Erik B**, Niels J Westergaard, Finn E Christensen, Sonny Massahi, Brian Shortt, Daniele Spiga, Mathias Solstad and Kim Lefmann. “Simulating X-ray telescopes with McXtrace: A case study of ATHENA’s optics”. In: *SPIE Astronomical Telescopes + Instrumentation*. International Society for Optics and Photonics. 2016, pp. 990575–990575.
- [4] D Spiga, F. E. Christensen, M Bavdaz, MM Civitani, P Conconi, **Knudsen, E B** Della Monica Ferreira D, S Massahi, G Pareschi, B Salmaso et al. “Simulation and modeling of silicon pore optics for the ATHENA X-ray telescope”. In: *SPIE Astronomical Telescopes + Instrumentation*. International Society for Optics and Photonics. 2016, 990550–990550.
- [13] **Knudsen, Erik B**, Martin M Nielsen, Kristoffer Haldrup, Eric J Topel and Søren Schmidt. “Novel applications of the x-ray tracing software package McXtrace”. In: *SPIE Optical Engineering + Applications*. International Society for Optics and Photonics. 2014, 92090B–92090B.
- [20] Jana Baltser, **Knudsen, Erik**, Anette Vickery, Oleg Chubar, Anatoly Snigirev, Gavin Vaughan, Robert Feidenhans and Kim Lefmann. “Advanced simulations of x-ray beam propagation through CRL transfocators using ray-tracing and wavefront propagation methods”. In: *SPIE Optical Engineering + Applications*. International Society for Optics and Photonics. 2011, pp. 814111–814111.

- [22] Andrea Prodi, **Knudsen, E**, P Willendrup, S Schmitt, C Ferrero, R Feidenhans and Kim Lefmann. “A Monte Carlo approach for simulating the propagation of partially coherent x-ray beams”. In: *SPIE Optical Engineering+ Applications*. International Society for Optics and Photonics. 2011, pp. 814108–814108.
- [24] **Knudsen, Erik B**, Andrea Prodi, Peter Willendrup, Kim Lefmann, Jana Baltser, Carsten Gundlach, Manuel Sanchez del Rio, Claudio Ferrero and Robert Feidenhans. “McXtrace: a modern ray-tracing package for x-ray instrumentation”. In: *SPIE Optical Engineering+ Applications*. International Society for Optics and Photonics. 2011, 81410G–81410G.

Book Chapter

- [26] A Alpers, L Rodek, Henning Friis Poulsen, **Erik Bergbäck Knudsen** and G T Herman. “Discrete tomography for generating maps of polycrystals”. In: *Advances in discrete tomography and its applications*. Ed. by G T Herman and A Kuba. Applied and Numerical Harmonic Analysis. Berlin: Birkhäuser, 2007, pp. 271–301. ISBN: 978-0-8176-3614-2.