

Curriculum Vitae

(080710)

Name: Emil Johansson Bergholtz

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Born 13 March 1978 in Nyköping, Sweden. Swedish citizen.

1999-2002 Undergraduate studies at Stockholm University in physics, mathematics, computer science and philosophy corresponding to 5 years of studies in terms of credits. Graduated in physics in 2002 (degree awarded in 2003).

2003-2008 PhD studies in theoretical physics at Stockholm University. My supervisor was professor Anders Karlhede.

2008-? (Starting in September) Visiting researcher (postdoc) at "Max Planck Institute for the Physics of Complex Systems" in Dresden, Germany.

Academic degrees:

- 2003 Fil. Mag. Diploma work: "Density Matrix Renormalization Group Analysis of Spin Chains and Quantum Hall Systems".
- 2005 Fil. Lic. (advanced master) Title: "New light on the quantum Hall system". Opponent: Prof. Edwin Langmann (KTH).
- 2008 Fil. Dr. (PhD) Title: "One-dimensional theory of the quantum Hall system". Opponent: Prof. Nick Read (Yale).

Research papers :

- "Density Matrix Renormalization Group Study of a Lowest Landau Level Electron Gas on a Thin Cylinder", Emil J. Bergholtz and Anders Karlhede, [arXiv:cond-mat/0304517], (2003).
- "Half-filled Landau level on a thin torus", Emil J. Bergholtz and Anders Karlhede, Phys. Rev. Lett. 94, 026802 (2005) [arXiv:cond-mat/0406394].
- "'One-dimensional' theory of the quantum Hall system", Emil J. Bergholtz and Anders Karlhede, J. Stat. Mech. (2006) L04001, [arXiv:cond-mat/0509434].
- "Pfaffian quantum Hall state made simple: multiple vacua and domain walls on a thin torus", E. J. Bergholtz, J.Kailasvuori, E.Wikberg, T.H.Hansson and A. Karlhede, cond-mat/0604251, Phys. Rev. B 74, 081308(R) (2006).
- "A simple view on the quantum Hall system", Emil J. Bergholtz and Anders Karlhede, cond-mat/0611181 (2006). Accepted as a chapter of the book of the Les Houches school on Quantum Magnetism, to be published by Springer.
- "Microscopic theory of the quantum Hall hierarchy", E. J. Bergholtz, M. Hermanns, T.H.Hansson and A. Karlhede, Phys. Rev. Lett. **99** 256803 (2007) [arXiv:cond-mat/0702516] (2007).
- "Quantum Hall wave functions on the torus", M. Hermanns, J. Soursa, E. J. Bergholtz, T.H.Hansson and A. Karlhede. Phys. Rev. B **77** 125321 (2008), [arXiv:0711.4684].
- "Quantum Hall system in Tao-Thouless limit", E.J. Bergholtz and A. Karlhede. Phys. Rev. B **77**, 155308 (2008), [arXiv:0712.1927].
- "Hierarchy wave functions--from conformal correlators to Tao-Thouless states", E. J. Bergholtz, M. Hermanns, T.H.Hansson, A. Karlhede and S.F Viefers. Phys. Rev. B **77**, 165325 (2008) [arXiv:0712.3848].
- "Degeneracy of non-abelian quantum Hall states on the torus: domain walls and conformal field theory", Eddy Ardonne, Emil J. Bergholtz, Janik Kailasvuori, and Emma

Wikberg. J. Stat. Mech. (2008) P04016, [arXiv:0802.0675].

Conferences, talks and summer schools:

- 2001 and 2002 (2x1 week) "Nordita Master Class" in Hilleröd, Denmark.
- 2002-2008 I have given several talks on different topics Stockholm University.
- 2003 (1 week) "Nordita summer school on strongly correlated electrons" in Hilleröd, Denmark.
- 2003 and 2004 Nordic conference on theoretical condensed matter physics in Stockholm. I gave a talk about DMRG applied to the quantum Hall problem in 2003.
- 2004 (1 week) "3rd PSI summer school on condensed matter research" in Zuoz, Switzerland. Presented a poster on "Half-filled Landau level on a thin torus".
- 2004 Meeting on theoretical condensed matter physics in Oslo.
- 2005- "NordForsk network meeting on low-dimensional physics" Nordita, Copenhagen (June 2005), Oslo (November 2005), Stockholm (March 2006), Lofoten (August 2006), Jyväskylä (October 2006), Göteborg (March 2007). I have given talks about the quantum Hall effect in Oslo and in Jyväskylä.
- 2006 APS March meeting in Baltimore. I gave a talk "An Exact Solution for the Half-filled Lowest Landau Level".
- 2006 (3 weeks) Summer school on "Quantum Magnetism" in Les Houches, France.
- 2007 APS March meeting in Denver. I gave a talk "A simple view on the quantum Hall system".
- 2007 Nordita program on Quantum Fluids. I gave a talk "The Quantum Hall system: solvable limit and beyond".
- 2007 I gave a seminar "Solvable limit of the quantum Hall system" at Freie Universität in Berlin.
- 2007 I gave a seminar "Solvable limit of the fractional quantum Hall system" at the Max Planck Institute for the Physics of Complex Systems in Dresden.

Teaching experience:

- 1998-1999 Worked full-time as a mathematics, physics and technology teacher in compulsory school.
- 2003- Teaching 20% at the physics department. Mostly problem solving classes and tutorials on introductory and advanced quantum mechanics (Sakurai's book), classical electrodynamics (Jackson's book) and classical mechanics.
- Completed a course in University teaching and pedagogy (2 weeks of full-time study).

Miscellaneous:

- 1997-1998 One year of full time studies in economics, law and organization at Mälardalen University.
- 2004-2006 Member of the hiring committee for senior positions at the faculty of sciences.
- 2006-2008 Member of the board of the physics department at Stockholm University.

References:

- Professor Anders Karlhede, Stockholm University. Email: ak@physto.se
- Professor Thors Hans Hansson, Stockholm University. Email: hansson@physto.se
- Ass. Professor Eddy Ardonne, Nordita. Email: ardonne@nordita.org
- Associate Professor Susanne Viefers, Oslo University. Email: s.f.viefers@fys.uio.no