

Lecture Course: Introduction to Supersymmetry and Supergravity

WS 2015/16

- Lecturer:

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- Date and Place:

Tue, 09.15-10.45, SR 2, Bldg. 2a, Campus Bahrenfeld
Fri, 11.15-12.45, SR 2, Bldg. 2a, Campus Bahrenfeld

- Credit Points:

Successful solution of at least 40% of the problems.
Grades: 40% = 4.0, 44% = 3.7, 48% = 3.3, ..., 72%=1.3, 76%=1.0

- Recomended Textbooks

- [1] P. Binetruy, *Supersymmetry*, Oxford University Press, 2006.
- [2] M. Dine, *Supersymmetry and String Theory*, Cambridge University Press, 2007.
- [3] D. Freedman and A. Van Proeyen, *Supergravity*, Cambridge University Press, 2012.
- [4] S. Weinberg, *The Quantum Theory of Fields, Vol III*, Cambridge University Press, 2000.
- [5] J. Wess and J. Bagger, *Supersymmetry and Supergravity*, Princeton University Press, 1992.

• Outline:

- 13.10: The Supersymmetry Algebra
- 16.10: Representations of $N = 1$ Supersymmetry and the Chiral Multiplet
- 20.10: postponed
- 23.10: Exercise 1
- 27.10: Chiral Multiplets in Superspace
- 30.10: Super Yang-Mills Theories
- 03.11: Super Yang-Mills Theories coupled to Matter and the MSSM
- 06.11: Exercise 2 → **HS 61**
- 10.11: Spontaneous Supersymmetry Breaking → **HS 61**
- 13.11: Nonrenormalizable Couplings
- 17.11: Pure $N = 1$ Supergravity → **SR 1, Bldg. 1**
- 20.11: Exercise 3
- 24.11: $N = 1$ Supergravity coupled to SYM and Matter
- 27.11: Spontaneous supersymmetry breaking in supergravity
- 01.12: N -extended Supersymmetry
- 04.12: Exercise 4
- 08.12: QFTs with global $N = 2$ Supersymmetry
- 11.12: $N = 2$ Supergravity coupled to SYM and charged matter
- 15.12: Seiberg-Witten theory
- 18.12: Exercise 5
- 05.01: $N = 4$ and $N = 8$ Supergravity
- 08.01: Spinors and Supersymmetry in arbitrary dimensions
- 12.01: Kaluza-Klein compactifications and dimensional reduction
- 15.01: Exercise 6
- 19.01: Supergravities with 32 supercharges
- 22.01: Supergravities with 16 supercharges
- 26.01: Chiral Supergravities in $d = 6, 10$
- 29.01: Exercise 7