References and further reading

- The arguments of Lecture 1 are based on [1] (chapter 1).
- A reference for Lie superalgebras aimed at physicists is for example [2].
- The material of Lecture 3 is covered in many QFT textbooks. Our discussion is similar to [3] (chapters 33 and following).
- Lecture 4 is based on [4] (chapter I) and [5] (section 25.2).
- Lectures 5 and 6 are based on [4] (chapter II), see also [1] (chapter 1)
- Lectures 7 to 13 use the notation of [4] (up to X instead of A for the scalar in a chiral multiplet), but the logic is modeled after [1] (chapter 2). The discussion of R-symmetry in Lecture 10 is based on the arguments reviewed in [6] (sections 6.2.1 and 6.2.3). The discussion of fermionic matrices in Lecture 13 is based on the more systematic treatment of [5] (section 26.4). The difference between gauge covariant and gauge non-covariant SUSY transformations is discussed in component language in [6] (sections 6.3.1, 6.3.2 and 14.1.1). The discussion of FI term in Lecture 12 is modeled after the more detailed component-field treatment of [6] (section 14.4.3).
- Lectures 14 to 18 are largely based on [4] (chapters IV to VII). The coset approach to superspace of Lecture 14 is modeled after Cyril Closset's lecture notes for this class last year, with some changes in notation. More information on the superdeterminants mentioned in Lecture 15 can be found e.g. in [7]. We refer to the same paper for more information on "chiral superspace" as a coset. The "compensating gauge transformation" in superspace described in Lecture 17 is also discussed in [5] (section 27.8).
- Lecture 19 is based on [4] (chapter XXII), with some changes in notation.
- Lecture 20 is based on [1] (chapter 2), [8], and [6] (chapter 14).
- The reminder on renormalization in Lecture 21 is based on [3] and [9]. An "elementary" discussion of renormalization in the Wess-Zumino model can be found in [10]. For a very detailed review on Feynman diagrams in superspace we refer to [7].
- For more details about the difference between 1PI and Wilsonian effective actions, discussed in Lecture 22, we refer to [11] and [12].
- Lecture 23 is based on [1] (chapter 3)
- Lecture 24 is based on [1] (sections 8.4, 8.6)
- Lecture 25 is based on [1] (section 3.1 and chapter 7)
- In Lecture 26, the treatment of the O'Raifeartaigh model is from [1] (section 5.1), while the treatment of SQED with an FI term is from [4] (chapter VIII). The classical Goldstino theorem

is discussed in [1] (section 5.3) but in that reference eq. 5.27 is slightly incorrect (there should be a complex conjugate on $\mathcal{F}_i$, as can also be seen by the mismatch in the positions of i indices). The correct formula (in a slightly different notation) can be found in [6] (section 14.5.4). (Note that $\overline{F}_i = -W_i$; the authors of [6] write the answer in terms of W, not $\overline{F}$.) The quantum Goldstino theorem is discussed in greater detail in [1] (section 5.4). Our exposition is a summary based on [16] (section 2).

- Lecture 27 is based on [1] (section 2.8). A nice discussion of soft SUSY breaking terms can also be found in [19] (section 5).

- For Lecture 28, we refer to Closset's notes for more information on SQM. See also [17] (sections 10.1, 10.2). Our summary on the Witten index is based on Witten's original paper [18].

- Lecture 29 follows [1] (chapter 4). The expression for R-parity in superspace, and other input for the lecture, is from [19] (sections 3 and 4).

- In Lecture 30, we refer to e.g. [20] (end of chapter 3) for an introduction to the vielbein formalism in GR. For more details on the Rarita-Schwinger action and the explicit form of the omitted 4-Fermi terms we refer to [6] (chapter 9). The scalar potential of matter-coupled SUGRA is described in [1] (section 15.3). The supersymmetric black holes briefly discussed during the last lecture are described in [6] (section 22.4).

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