Syllabus for FYS5120 – Advanced Quantum Field Theory, spring 2020

Anders Kvellestad

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The syllabus for this self-study course is based on the book *An Introduction to Quantum Field Theory* by Michael E. Peskin and Daniel V. Schroeder (PS). However, the topics we'll study are covered in many QFT books. In particular, *Quantum Field Theory* (2nd edition) by Franz Mandl and Graham Shaw might be a useful supplement.

- PS Ch. 6 (Radiative corrections)
- PS Ch. 7.1, 7.3, 7.4, 7.5 (Radiative corrections cont.)
- PS Ch. 8 (UV cutoffs and critical fluctuations)
- PS Ch. 10.1, 10.2 (Counting UV divergences, renorm. perturbation theory)
- PS Ch. 12 (The renormalization group)
- PS Ch. 16 (Quantization of non-Abelian gauge theories)
- PS Ch. 17 (Quantum chromodynamics)
- PS Ch. 18.1 – 18.4 (Operator products and effective vertices)

PS Ch. 9 (functional methods) was already part of FYS4170, so it's not part of the official syllabus for this course. But in case you didn't have enough time to read it in FYS4170, it doesn't hurt repeating it as part of this course.

Note: We may make some small adjustments to the syllabus. This will be announced via email, and this document will be updated.