

Some References to H. W. Grießhammer: Effective Field Theories in Few-Nucleon Systems

This is an incomplete, biased list of references I found useful when preparing the lectures, mostly of lecture notes and review articles. Please consult them as exhaustive bibliographic and historic resources for the original publications. I do usually not mention original articles. Ordering by date of publication only. No guarantees as to completeness, usefulness or relevance. Your mileage may vary.

A *manu*-script similar to the lecture: home.gwu.edu/~hgrie/lectures/lectures.0806.NNPSS2008-GW.djvu

Introductions to EFT and Its Applications to Nuclear Physics

- [1] D. B. Kaplan, *Five lectures on effective field theory*, arXiv:nucl-th/0510023. Very pedagogic, updated version of [10] which has more emphasis on Chiral Perturbation Theory, EFT(\not{p}) and χ EFT, including exercises – a template for my presentation.
- [2] D. R. Phillips, *Building light nuclei from neutrons, protons, and pions*, Czech. J. Phys. **52**, B49 (2002) [arXiv:nucl-th/0203040]. A very nice and pedagogic review which grew out of the 2001 Praha Summer School, with very instructive exercises which focus on EFT(\not{p}) – a template for my presentation.
- [3] P. F. Bedaque and U. van Kolck, *Effective field theory for few-nucleon systems*, Ann. Rev. Nucl. Part. Sci. **52**, 339 (2002) [arXiv:nucl-th/0203055]. Focus on Nuclear EFT(\not{p}) and χ EFT – a template for my presentation.
- [4] U. van Kolck, L. J. Abu-Raddad and D. M. Cardamone, *Introduction to effective field theories in QCD*, arXiv:nucl-th/0205058. Written in close collaboration between students and lecturer; focuses on χ EFT and does not use many formulae.
- [5] B. R. Holstein, *Effective interactions are effective interactions*, arXiv:hep-ph/0010033. Pedagogic introduction to EFTs from its beginnings to χ EFT.
- [6] S. R. Beane, P. F. Bedaque, W. C. Haxton, D. R. Phillips and M. J. Savage, *From hadrons to nuclei: Crossing the border*, arXiv:nucl-th/0008064. Exhaustive review of the status of the field in 2000.
- [7] U. van Kolck, *Effective field theory of nuclear forces*, Prog. Part. Nucl. Phys. **43**, 337 (1999) [arXiv:nucl-th/9902015].
- [8] G. P. Lepage, *How to renormalize the Schroedinger equation*, arXiv:nucl-th/9706029. Very influential and pedagogic account of the key ideas of Renormalisation and EFTs, building on the uses of the Schrödinger equation in QED, QCD and χ EFT.
- [9] A. V. Manohar, *Effective field theories*, arXiv:hep-ph/9606222. Pedagogic account for high-energy physicists, focusing on EFTs in QCD.
- [10] D. B. Kaplan, *Effective field theories*, arXiv:nucl-th/9506035. Renormalisation-group aspects of EFTs, including exercises.
- [11] H. Georgi, *Effective field theory*, Ann. Rev. Nucl. Part. Sci. **43**, 209 (1993). A top-cited classic which puts concepts before formulae.
- [12] G. P. Lepage, *What is Renormalization?*, arXiv:hep-ph/0506330. Originally published in 1989, this talk on the EFT philosophy proved so influential that the author set it on the arXiv in 2005.
- [13] A. Manohar and H. Georgi, *Chiral Quarks And The Nonrelativistic Quark Model*, Nucl. Phys. B **234**, 189 (1984). First mention of “Naïve Dimensional Analysis”.

- [14] S. Weinberg, *Phenomenological Lagrangians*, Physica A **96**, 327 (1979). The paper that started it all. . .

Some Trends in Nuclear Physics: EFT(π)

- [15] L. Platter, “*Low-Energy Universality in Atomic and Nuclear Physics*”, arXiv:0904.2227 [nucl-th]. A wonderful review, spanning the field in its breadth, with nice account of universality in EFT(π).
- [16] H. W. Hammer, D. R. Phillips and L. Platter, *Pion-mass dependence of three-nucleon observables*, Eur. Phys. J. A **32**, 335 (2007) [arXiv:0704.3726 [nucl-th]]. Strikingly simple account why it’s very useful.
- [17] H. W. Griesshammer, *Naive Dimensional Analysis for Three-Body Forces Without Pions*, Nucl. Phys. A **760**, 110 (2005) [arXiv:nucl-th/0502039]. Not so interesting in itself, but exhaustively cites the relevant literature.

Some Trends in Nuclear Physics: Renormalisation Group Perspectives of χ EFT

- [18] M. C. Birse, “*Functional renormalisation group for two-body scattering*,” Phys. Rev. C **77** (2008) 047001 [arXiv:0801.2317 [nucl-th]];
Deconstructing triplet nucleon-nucleon scattering, arXiv:0706.0984 [nucl-th];
Power counting with one-pion exchange, Phys. Rev. C **74**, 014003 (2006) [arXiv:nucl-th/0507077].
- [19] A. Nogga, R. G. E. Timmermans and U. van Kolck, *Renormalization of One-Pion Exchange and Power Counting*, Phys. Rev. C **72**, 054006 (2005) [arXiv:nucl-th/0506005].
- [20] S. R. Beane, P. F. Bedaque, M. J. Savage and U. van Kolck, *Towards a perturbative theory of nuclear forces*, Nucl. Phys. A **700**, 377 (2002) [arXiv:nucl-th/0104030].

Some Further, Phenomenologically Oriented Recent Developments in Nuclear Physics

- [21] E. Epelbaum, H. W. Hammer and U. G. Meissner, *Modern Theory of Nuclear Forces*, arXiv:0811.1338 [nucl-th]. The most up-to-date introduction to the phenomenology of Chiral EFT for few-Nucleon systems. Some provocative statements for experts included.
- [22] V. Bernard, *Chiral Perturbation Theory and Baryon Properties*, arXiv:0706.0312 [hep-ph]. The most up-to-date introduction to Chiral Perturbation Theory and its extension to the one-baryon sector.
- [23] R. Machleidt, *Nuclear forces from chiral effective field theory*, arXiv:0704.0807 [nucl-th]. A sometimes provocative, hands-on account of χ EFT.
- [24] M. J. Ramsey-Musolf and S. A. Page, *Hadronic parity violation: A new view through the looking glass*, Ann. Rev. Nucl. Part. Sci. **56** (2006) 1 [arXiv:hep-ph/0601127]. Review on χ EFT in hadronic, parity-violating processes.
- [25] E. Epelbaum, *Few-nucleon forces and systems in chiral effective field theory*, Prog. Part. Nucl. Phys. **57**, 654 (2006) [arXiv:nucl-th/0509032]. Another hands-on interpretation and summary of χ EFT.
- [26] S. Scherer and M. R. Schindler, *A chiral perturbation theory primer*, arXiv:hep-ph/0505265. Exhaustive and pedagogic lectures on Chiral Perturbation Theory.

Some Recent Developments in Atomic Physics – See also [15] above

- [27] E. Braaten and H. W. Hammer, *Universality in Few-body Systems with Large Scattering Length*, Phys. Rept. **428**, 259 (2006) [arXiv:cond-mat/0410417]. Much on more conventional models, but EFT is fully embedded.