

Heavy Quark Effective Theory: a predictive EFT on the lattice

R. Sommer

*John von Neumann Institute for Computing (NIC), DESY,
Platanenallee 6, 15738 Zeuthen, Germany*

&

*Institut für Physik, Humboldt-Universität zu Berlin, Newtonstr. 15,
12489 Berlin, Germany*

*Lectures at the Summer School on
“EFT in Particle Physics and Cosmology”
Les Houches, July 3–28, 2017*

Contents

1 EFT for the lattice vs. EFT on the lattice	1
1.1 Overview	1
1.2 Why EFT on the lattice?	1
2 Heavy Quark Effective Theory at zero velocity	3
2.1 Lagrangian and propagator	3
2.2 Symmetries	3
3 Non-perturbative formulation of EFT	4
4 Renormalization	5
4.1 At leading order in $1/m_b$	5
4.2 At higher orders in $1/m_b$	5
5 The lattice formulation	6
5.1 QCD on the lattice	6
5.2 HQET on the lattice	6
6 Non-perturbative HQET	7
6.1 Masses, matrix elements	7
6.2 Matching	7
6.3 Example results	7
7 Summary	8