

Index

- anomalous dimension
 - $\Delta c = 0$ nonleptonic b decay, 184
 - $\Delta c = 1$ nonleptonic b decay, 29
 - $\Delta b = 2$, 99
 - heavy quark, 80
 - heavy-heavy, 83
 - heavy-light, 82
 - magnetic moment, 103
 - operator, 16, 28
 - velocity dependent, 83
- B meson, 46
 - decay constant, 61–63
 - exclusive decay rate, 65–70
 - form factor relations, 69
 - inclusive decay, *see* inclusive decay
 - mass, 50, 106, 107
 - pion couplings, 135
- B^* meson, 46
 - decay constant, 61–63
 - mass, 50, 106, 107
- B_s meson
 - decay constant, 63
 - mass, 50, 107
 - mixing, 181–185
- β function, 14, 18
- Borel transform, 116
- bound, on slope of Isgur-Wise function, 178
- Cabibbo-Kobayashi-Maskawa Matrix, *see* CKM matrix
- chiral Lagrangian, 20–24, 43
 - covariant derivative, 134, 143
 - heavy baryon, 149
 - heavy meson, 134
 - $1/m$ correction, 135
 - loops, 23
 - parity, 132, 133
 - power counting, 20, 23, 43
 - scale Λ_{CSB} , 20
- chiral symmetry, 17–24
- CKM matrix, 7, 8, 43
- composite operator, *see* operator
- coupling, running, 15, 18
- covariant derivative, 5
- D meson, 46
 - decay constant, 61–63
 - mass, 49, 106, 107
 - pion couplings, 135
- D^* meson, 46
 - decay constant, 61, 62
 - isospin violating decay, 145
 - mass, 49, 107
 - radiative decay, 141, 142
 - strong decay, 135
- $D_{1,2}^{(*)}$, 46
 - \bar{B} decay to, 74, 127–128
 - mass, 49
 - strong decay, 48–52
- D_s meson
 - decay constant, 63
 - mass, 49
- decay constant
 - heavy meson, 61–63, 93–95, 149
 - π , K , 31, 32
- dimensional regularization loop integral, 10
- effective Hamiltonian, 25–30
 - anomalous dimension, 30
 - μ decay, 26
 - nonleptonic decay, 27, 28
 - radiative corrections, 27, 28
- $\mathcal{F}_{D^{(*)}}$, 67, 69, 115
- Fermi constant, 26

- Feynman parameter, 10
 field strength, gluon, 17
 form factor
 $B \rightarrow D_{1,2}^{(*)}$, 74, 127–128
 $B \rightarrow D^{(*)}$, 63–70, 113, 114
 $B \rightarrow \pi$, 138, 140
 $D \rightarrow \pi$, 138
 $\Lambda_b \rightarrow \Lambda_c$, 72, 107, 108, 111, 112
 $\Lambda_c \rightarrow \Lambda$, 70–71
 fragmentation, 52–54
- gauge boson
 masses, 5
 gauge fixing, 6
 gluon field strength, 17
 g_π , 135, 138
- H field, 54–58
 constraints, 55
 definition, 55
 heavy quark, spin of, 56
 light degrees of freedom, spin of, 56
 Lorentz transformation, 55
 parity, 55
- heavy meson
 decay constant, 63
 form factors
 $B \rightarrow D^{(*)}$, definition, 64
- heavy quark
 field, constraint on, 59
 flavor symmetry, 45
 magnetic moment, 142
 propagator, 58
 spin, 45
 spin symmetry, 45
 vertex, 59
- heavy quark states, normalization of, 60–61
 Higgs boson, 2
 Higgs potential, 3, 4
 HQET Lagrangian, 58–60
- inclusive decay
 differential distribution, 164, 166
 electron endpoint, 154, 168–173
 electron spectrum, 158, 165
 gluon operator, 162, 179
 kinematics, 151
 nonleptonic, 178–181
 nonleptonic width, 179
 radiative corrections, 174
 semileptonic, 151–173
 decay distributions, 152
 semileptonic width, 165, 166, 174
 $T_{\mu\nu}$, 155
 $W_{\mu\nu}$, 153
- integrating out, 24
 Isgur-Wise function, 68, 72, 108
 normalization, 72
 normalization at zero recoil, 69
- Lagrangian
 chiral, 20, 134
 HQET at order $1/m_Q$, 103
 QCD, 17
 QED, 9
- λ_1 , 106, 174
 λ_2 , 106
 Λ_b , 47
 field, 57
 form factors, 72
 mass, 50, 106, 107
 $\bar{\Lambda}$, 105, 174
 Λ_c , 47
 decay, 70–71
 field, 57
 form factors, 70–71
 mass, 1, 49, 107
 Λ_{QCD} , definition, 19
 lepton masses, 6
 loops, 8–15
 Luke's theorem, 112, 114, 148
- magnetic moment, 142, 143
 mass
 heavy hadron, 49, 50, 105–107, 127
 $\overline{\text{MS}}$, 120
 pole, 119, 120
 pseudo-Goldstone boson, 21
 residual, 119
- mass terms, 5–6
 matching, 24, 84–87
 coupling constant, 24
 heavy-heavy, 95, 96, 98
 heavy-light, 85, 88, 92, 93
 Λ_{QCD} , 24
 magnetic moment, 103
 renormalons, 118
- $\overline{\text{MS}}$
 mass, 120
 scheme, 11
- nonrelativistic quark model, 24, 136–138, 143, 149
 NRQCD, 124–127
- OPE, 32–41
 for deep inelastic scattering, 38, 41
 inclusive decay, 157–164

- operator
 anomalous dimension, 16, 28, 43
 mixing, 17, 28
 renormalization, 15–17
 operator product expansion, *see* OPE
- pion couplings
 heavy meson, 135
 pole mass, 119–121
 power counting, 23, 120
 projection operator, velocity, 58
 propagator, for heavy quark, 58
- quark
 field, heavy, 58
 masses, 6
- renormalization
 charge, 13
 HQET, 77–99
 mass, 13, 18
 operator, 15–17, 82–83
 vertex, 13, 43
 wave function, 11–13, 18, 78–80
 renormalon, 115–123
 reparametrization invariance, 104–105
 residual mass, 119
- Σ_b , 50, 106
 Σ_c , 49, 107
- Σ_b^* , 50, 106
 Σ_c^* , 49, 107
 Σ field, 20
 $\sin^2 \theta_W$, 5
 spin of the light degrees of freedom, 45
 Standard Model, 1–8
 sum rules, 175–178, 186
- $T_{\mu\nu}$ for semileptonic decay, 155
 twist, 36, 37
 twist-two operators, 37
- V_{cb} , 8, 114
 from exclusive decays, 115
 from inclusive decays, 173–175
- V_{ub} , 8
 from inclusive decay, 171
- W
 fermion couplings, 7
 mass, 5
 $W_{\mu\nu}$, 33, 153
 weak Hamiltonian, *see* effective Hamiltonian
- Yukawa couplings, 6
- Z mass, 5

