

List of Tables

1.1	Experimental facility and their objective	3
2.1	Parameters for quarkonium spectroscopy	15
2.2	Mass spectrum of S and P -wave charmonia (in GeV)	15
2.3	Mass spectrum of D and F -wave charmonia (in GeV)	16
2.4	Mass spectrum of S and P -wave bottomonia (in GeV)	17
2.5	Mass spectrum of D and F -wave bottomonia (in GeV)	17
2.6	Mass spectrum of S and P -wave B_c meson (in GeV)	18
2.7	Mass spectrum of D and F -wave B_c meson (in GeV)	19
2.8	Leptonic decay constant of charmonia (in MeV)	21
2.9	Leptonic decay constant of bottomonia (in MeV)	22
2.10	Pseudoscalar decay constant of B_c meson (in MeV)	22
2.11	Vector decay constant of B_c meson (in MeV)	22
2.12	Digamma decay width of S and P -wave charmonia (in keV)	23
2.13	Digamma decay width of S and P -wave bottomonia (in keV)	24
2.14	3γ decay widths of charmonia (in eV) and bottomonia (in 10^{-6} keV) .	24
2.15	Digluon decay width of S and P -wave charmonia (in MeV)	26
2.16	Digluon decay width of S and P -wave bottomonia (in MeV)	26
2.17	$3g$ decay widths of charmonia (in keV) and bottomonia (in keV) . . .	27
2.18	γgg decay widths of charmonia (in keV) and bottomonia (in keV) . .	27
2.19	Dilepton decay width of charmonia (in keV)	27

2.20	Dilepton decay width of bottomonia (in keV)	28
2.21	$E1$ transition width of charmonia (in keV)	29
2.22	$E1$ transition width of bottomonia (in keV)	30
2.23	$E1$ transition width of B_c meson (in keV)	31
2.24	$M1$ transition width of charmonia (in keV)	31
2.25	$M1$ transition width of bottomonia (in eV)	32
2.26	$M1$ transition width of B_c meson (in eV)	32
3.1	Model parameters	40
3.2	Masses of doubly heavy baryons (in MeV)	41
3.3	Magnetic moment in μ_N	42
3.4	Transition magnetic moment in μ_N	43
3.5	Radiative decay width (in keV)	43
4.1	Fitted parameters for computing the masses	47
4.2	Masses of $Z_c^+(D^+\bar{D}^*)$, $Z_b^+(B\bar{B}^*)$ and $Z_b'(B^*\bar{B}^*)$ molecular states (in MeV) with the variation in potential depth C (in MeV)	48
4.3	Hadronic decay widths of Z_c^+ , Z_b^+ and Z_b' molecular states (in MeV)	50
5.1	Quark masses and infrared cutoff parameter in GeV	57
5.2	Meson size parameters in GeV	57
5.3	Leptonic decay constants f_H (in MeV)	58
5.4	Leptonic $D_{(s)}^+$ branching fractions	58
5.5	Quark channel and associated CKM matrix element for semileptonic decays ($\phi = 39.3$ deg)	60
5.6	Form factors and associated double pole parameters	61
5.7	Comparison of $F_+(0)$ for $D_{(s)} \rightarrow P$ transitions at maximum recoil.	63
5.8	Ratios of the $D_{(s)} \rightarrow V$ transition form factors at maximum recoil.	63
5.9	$D \rightarrow \pi(K)\ell\nu$ form factors and their ratios at $q^2 = 0$	67
5.10	Semileptonic decays of D^0 mesons (in %)	68

5.11 Semileptonic decays of D^+ mesons	69
5.12 Semileptonic branching fractions of D_s mesons (in %).	70
5.13 Ratios of the semileptonic decays	71
5.14 Semileptonic branching fractions for $D_{(s)}^+ \rightarrow D^0 \ell^+ \nu_\ell$	71
5.15 Forward-backward asymmetry and longitudinal polarization.	72