Decay for spin conserved transitions

Hybrid nL_J	E MeV	Charm n'L'	E' MeV	Decay \Delta MeV	\a (\Delta)	C^2	INT<irf> 1/GeV	\Delta/m	* <i|r|f>\D E	* <i r f> GeV	<f r f> GeV	\calV/m	\Gamma MeV	errorE	alpha	multip	cornell	rel.1	rel.2	d\G%	error
$2p_0$	4917	$1s$	3068	1849	0.30	0.33	0.51	1.26	**0.54**	0.29	2.06	1.00	**37**	0.25	0.32	0.007	0.67	0.099	0.12	0.80	**29**
$3p_0$	5315	$1s$	3068	2247	0.28	0.33	0.20	1.53	**0.26**	0.12	2.06	1.27	**9**	0.21	0.29	0.002	0.55	0.146	0.16	0.69	**6**
		$2s$	3674	1641	0.32	0.33	0.51	1.12	0.48	0.29	3.84	1.38	27	0.28	0.35	0.006	1.46	0.078	0.17	1.54	41
		$1d$	3762	1553	0.32	0.67	-0.16	1.06	0.21	0.13	4.05	1.41	5	0.30	0.36	0.001	1.63	0.070	0.18	1.70	8
Hybrid		Bottom		Decay																	
$2p_0$	11261	$1s$	9551	1710	0.31	0.33	0.47	0.35	**0.46**	0.27	1.21	0.19	**25**	0.08	0.34	0.005	0.41	0.008	0.02	0.54	**13**
$3p_0$	11525	$1s$	9551	1974	0.29	0.33	0.25	0.40	**0.29**	0.15	1.21	0.24	**11**	0.07	0.31	0.002	0.35	0.010	0.03	0.48	**5**
		$2s$	10017	1508	0.33	0.33	0.61	0.31	0.53	0.35	2.45	0.26	31	0.09	0.37	0.007	0.99	0.006	0.03	1.06	33
		$1d$	10106	1419	0.34	0.67	-0.30	0.29	0.35	0.24	2.62	0.27	13	0.10	0.39	0.001	1.13	0.005	0.03	1.20	15

Hybrid nL_J	E/{E} MeV	Charm n'L'	E' MeV	Decay \Delta MeV	\a (\Delta)	C^2	INT<irf> 1/GeV	\Delta/m	* <i|r|f>\D E	* <i r f> GeV	<f r f> GeV	\calV/m	\Gamma MeV	errorE	alpha	multip	cornell	rel.1	rel.2	d\G%	error
$2p_1$	4556	$1s$	3068	1488	0.330	0.333	0.816	1.012	**0.701**	0.471	2.06	0.750	**54**	0.31	0.37	0.012	0.83	0.064	0.09	0.97	**52**
$3p_1$	4912	$1s$	3068	1844	0.300	0.333	0.396	1.254	**0.422**	0.229	2.06	0.992	**22**	0.25	0.32	0.004	0.67	0.098	0.12	0.80	**18**
		$2s$	3674	1238	0.361	0.333	0.988	0.842	0.707	0.571	3.84	1.107	50	0.38	0.44	0.012	1.93	0.044	0.14	2.02	100
		$1d$	3762	1150	0.375	0.667	-0.462	0.782	0.434	0.377	4.05	1.134	18	0.41	0.47	0.002	2.20	0.038	0.14	2.29	41
Hybrid		Bottom		Decay																	
$1p_1$	10772	$1s$	9551	1221	0.364	0.333	1.027	0.250	**0.724**	0.593	1.21	0.155	**52**	0.11	0.44	0.013	0.57	0.004	0.02	0.73	**38**
$2p_1$	10995	$1s$	9551	1444	0.334	0.333	0.659	0.296	**0.550**	0.381	1.21	0.256	**32**	0.10	0.38	0.008	0.48	0.005	0.03	0.62	**20**
		$2s$	10017	978	0.412	0.333	0.459	0.200	0.259	0.265	2.45	0.413	6	0.14	0.57	0.002	1.53	0.003	0.05	1.64	10
		$1d$	10106	889	0.438	0.667	-0.175	0.182	0.127	0.143	2.62	0.595	1.4	0.16	0.65	0.000	1.81	0.002	0.07	1.93	2.7
$3p_1$	11209	$1s$	9551	1658	0.314	0.333	0.412	0.340	**0.394**	0.238	1.21	0.384	**18**	0.08	0.35	0.004	0.42	0.007	0.05	0.55	**10**
		$2s$	10017	1192	0.368	0.333	0.605	0.244	0.416	0.349	2.45	0.408	17	0.12	0.45	0.004	1.25	0.004	0.05	1.34	23
		$3s$	10355	854	0.450	0.333	0.123	0.175	0.061	0.071	3.43	1.039	0.3	0.16	0.70	0.000	2.49	0.002	0.13	2.60	0.8
		$1d$	10106	1103	0.384	0.667	-0.285	0.226	0.256	0.232	2.62	0.502	6	0.13	0.49	0.001	1.46	0.003	0.06	1.54	10

Hybrid nL_J	E/{E} MeV	Bottom n'L'	E' MeV	Decay \D E MeV	\a \D E	C+	C-	INT+<irf> 1/GeV	INT-<irf> 1/GeV	\Delta/m	* <i|r|f>\D E	* <i r f> GeV	<f r f> GeV	\calV/m	\Gamma MeV	errorE	alpha	multip	cornell	rel.1	rel.2	d\G%	error
$2(s/d)_1$	10905	$1p$	9879	1026	0.400	0.4	1.0	0.680	0.022	0.214	0.464	0.452	1.985	0.130	18	0.14	0.53	0.004	1.17	0.003	0.02	1.29	23
$2(s/d)_1$	10885	$1p$	9899	986	0.410	0.4	1.0	0.680	0.022	0.205	0.446	0.452	1.985	0.130	16	0.00	0.56	0.004	1.21	0.003	0.02	1.34	22
$3(s/d)_1$	11103	$1p$	9879	1224	0.363	0.4	1.0	1.485	-0.194	0.255	0.911	0.745	1.985	0.170	136	0.11	0.44	0.021	0.98	0.004	0.02	1.08	147
$3(s/d)_1$	11100	$1p$	9899	1201	0.367	0.4	1.0	1.485	-0.194	0.250	0.894	0.745	1.985	0.174	130	0.00	0.45	0.020	1.00	0.004	0.02	1.09	142
$3(s/d)_1$	11103	$2p$	10234	869	0.444	0.4	1.0	-0.924	0.938	0.181	0.307	0.353	3.030	0.188	79	0.16	0.68	0.000	2.15	0.002	0.02	2.26	179
$3(s/d)_1$	11000	$2p$	10260	740	0.499	0.4	1.0	-0.924	0.938	0.154	0.262	0.353	3.030	0.172	55	0.00	0.67	0.000	2.53	0.001	0.02	2.62	143

* for spin conserved <i r f> = abs(INT<i r f>) * sqrt(angular coefficient: C^2) or consequently when we have two wave-functions. Used for \Gamma
for the multip we use abs(INT<i r f>) without angular coefficient

\Delta	E-E'	MeV
\a	strong coupling	
C^2	angular coefficient	
INT	integral for transition of initial and final wafe-functions without coeficients	GeV^-1
\Gamma	computed decay rate	MeV
\calV	Ei-<iVi>+Ef-<fVf>	
errorE	3*ARREL(2)*110/(\Delta)	3*ARREL(2)*33/(\Delta)
alpha	das(\Delta/1000)/alpha	das is a variation function in alpha definet at last page
multip	(<i|r|f>\Delta)^2/120 w/o angular coefficient	or (<i|r|f>\Delta)^2/24 for spin-flip
cornell	3*(0.215*(<f|r|f>)-0.028)/(\Delta/1000)	
rel.1	\Delta/(16 m)	
rel.2	\calV/(8 m)	or 5\calV/(24 m) for spin-flip
d\G%	square sum relative errors ^2	
error	d\G% * \Gamma	MeV

Decay for spin flipped transitions Hybrid spin 0

Hybrid		Charm		Decay					*	*												
nL_J	E/{E}	n'L'	E'	\D E	\a (\D E)	K^2	INT<i f>	INT<i r f >	<i f>\D E/m	<i|r|f>\DE	<i r f>	<f r f>	\calV/m	\Gamma								
	MeV		MeV	MeV			1/GeV				GeV	GeV		MeV	errorE	alpha	multip	cornell	rel.1	rel.2	d\G%	error
$2p_0$	4917	$1p$	3457	1460	0.333	3	0.135	-0.562	0.233	0.820	0.562	3.141	1.074	6	0.32	0.38	0.028	1.33	0.062	0.22	1.44	8
$3p_0$	5315	$1p$	3457	1858	0.299	3	0.050	-0.202	0.109	0.375	0.202	3.141	1.345	1.5	0.25	0.32	0.006	1.05	0.100	0.28	1.16	1.7
		$2p$	3958	1357	0.345	3	0.113	-0.908	0.181	1.233	0.908	4.658	1.447	3	0.34	0.40	0.063	2.15	0.053	0.30	2.24	8
Hybrid		Bottom		Decay																		
$2p_0$	11261	$1p$	9879	1382	0.341	3	0.242	-0.056	**0.119**	**0.078**	0.056	1.985	0.203	**1.5**	0.10	0.40	0.000	0.87	0.005	0.04	0.96	**1.4**
$3p_0$	11525	$1p$	9879	1646	0.315	3	0.110	-0.112	**0.064**	**0.185**	0.112	1.985	0.257	**0.5**	0.09	0.35	0.001	0.73	0.007	0.05	0.81	**0.4**
		$2p$	10234	1291	0.353	3	0.295	0.051	0.135	0.066	0.051	3.030	0.275	2	0.11	0.42	0.000	1.45	0.004	0.06	1.51	2.8

Hybrid		Charm		Decay					*	*												
nL_J	E/{E}	n'L'	E'	\D E	\a (\D E)	K^2	INT<i f>	INT<i r f >	<i f>\D E/m	<i|r|f>\DE	<i r f>	<f r f>	\calV/m	\Gamma								
	MeV		MeV	MeV			1/GeV				GeV	GeV		MeV	errorE	alpha	multip	cornell	rel.1	rel.2	d\G%	error
$2p_1$	4556	$1p$	3457	1099	0.385	3	0.291	0.118	0.376	0.129	0.118	3.141	0.829	13	0.42	0.49	0.001	1.77	0.035	0.17	1.89	25
$3p_1$	4912	$1p$	3457	1455	0.333	3	0.124	-0.123	0.213	0.178	0.123	3.141	1.071	5	0.32	0.38	0.001	1.33	0.061	0.22	1.44	7
		$2p$	3958	954	0.418	3	0.326	0.314	0.366	0.300	0.314	4.658	1.173	12	0.49	0.59	0.004	3.06	0.026	0.24	3.16	38
Hybrid		Bottom		Decay																		
$1p_1$	10772	$1p$	9879	893	0.436	3	0.847	2.029	0.269	1.812	2.029	3.141	0.042	6	0.16	0.65	0.137	2.17	0.002	0.01	2.28	14
$2p_1$	10995	$1p$	9879	1116	0.382	3	0.438	0.553	0.173	0.617	0.553	3.141	0.088	3	0.13	0.48	0.016	1.74	0.003	0.02	1.81	5
$3p_1$	11209	$1p$	9879	1330	0.348	3	0.235	0.126	0.111	0.168	0.126	3.141	0.132	1.3	0.11	0.41	0.001	1.46	0.005	0.03	1.52	1.9
		$2p$	10234	975	0.413	3	0.441	0.838	0.153	0.818	0.838	4.658	0.133	2.1	0.14	0.57	0.028	3.00	0.002	0.03	3.05	6.4

Hybrid		Charm		Decay							*	*												
nL_J	E/{E}	n'L'	E'	\D E	\a (\D E)	K^2	INTT<i f>+	INTT<i f>-	INT<i r f>+	INT<i r f>-	<i f>\DE/m	<i|r|f>\DE	<i r f>	<f r f>	\calV/m	\Gamma								
	MeV		MeV	MeV			1/GeV	1/GeV					GeV	GeV		MeV	errorE	alpha	multip	cornell	rel.1	rel.2	d\G%	error
$2(s/d)_1$	4394	$1s$	3068	1326	0.35	3		-0.36		-0.25	**0.56**	**0.33**	0.246	2.06	0.640	**33**	0.35	0.41	0.004	0.94	0.051	0.13	1.09	**36**
$2(s/d)_1$	4374	$1s$	3097	1277	0.36	3		-0.36		-0.25	**0.54**	**0.31**	0.246	2.06	0.646	**30**	0.00	0.42	0.004	0.97	0.047	0.13	1.07	**32**
$2(s/d)_1$	4415	$1s$	3097	1318	0.35	3		-0.36		-0.25	0.56	0.32	0.246	2.06	0.674	**32**	0.00	0.41	0.004	0.94	0.050	0.14	1.04	**33**
$3(s/d)_1$	4678	$1s$	3068	1610	0.32	3		-0.03		-0.35	**0.05**	**0.57**	0.354	2.06	0.833	**0.3**	0.29	0.35	0.014	0.77	0.075	0.17	0.92	**0.31**
$3(s/d)_1$	4623	$1s$	3097	1526	0.33	3		-0.03		-0.35	0.05	0.54	0.354	2.06	0.816	**0.3**	0.00	0.37	0.012	0.81	0.067	0.17	0.91	**0.27**
		$2s$	3674	1004	0.41	3		0.40		1.89	0.48	1.90	1.891	3.84	0.948	21	0.46	0.55	0.150	2.38	0.029	0.20	2.50	52
Hybrid		Bottom		Decay																				
$1(s/d)_1$	10704	$1s$	9551	1153	0.37	3		-0.77		-1.24	**0.32**	**1.43**	1.238	1.21	0.071	**10**	0.12	0.47	0.085	0.60	0.003	0.01	0.78	**7**
$1(s/d)_1$	10753	$1s$	9460	1293	0.35	3		-0.77		-1.24	0.36	1.60	1.238	1.21	0.063	**13**	0.00	0.42	0.107	0.54	0.004	0.01	0.69	**9**
$2(s/d)_1$	10905	$1s$	9551	1354	0.34	3		-0.49		-0.48	**0.24**	**0.65**	0.481	1.21	0.112	**6**	0.10	0.40	0.018	0.51	0.005	0.02	0.66	**4**
$2(s/d)_1$	10885	$1s$	9460	1425	0.34	3		-0.49		-0.48	0.25	0.69	0.481	1.21	0.090	**7**	0.00	0.39	0.020	0.49	0.005	0.02	0.62	**4**
		$2s$	10017	888	0.44	3		-0.41		-1.23	0.13	1.09	1.232	2.45	0.133	1	0.16	0.65	0.050	1.68	0.002	0.03	1.81	2.6
$3(s/d)_1$	11103	$1s$	9551	1552	0.32	3		-0.18		-0.17	0.10	0.26	0.167	1.21	0.153	**1**	0.09	0.36	0.003	0.45	0.006	0.03	0.58	**0.6**
$3(s/d)_1$	11000	$1s$	9460	1540	0.32	3		-0.18		-0.17	0.10	0.26	0.167	1.21	0.113	**1**	0.00	0.36	0.003	0.45	0.006	0.02	0.58	**0.6**
		$2s$	10017	888	0.44	3		-0.02		0.28	0.01	0.25	0.277	2.45	0.133	0.005	0.16	0.65	0.003	1.68	0.002	0.03	1.81	0.008
		$1d$	10106	799	0.47	3	0.70		1.79		0.20	1.43	1.789	2.62	0.142	3	0.18	0.72	0.085	2.01	0.002	0.03	2.14	7

* for spin flip <i r f> is just abs(INT<irf>) without angular coefficient, or consequently when we have two wave-functions. Used for multip
while <i f> = abs(INT<if>) * angular coefficient, or consequently when we have two wave-functions. Used for \Gamma

Decay for spin flipped transitions | Hybrid spin 1

Hybrid		Charm		Decay					*	*												
nL_J	E/{E}	n'L'	E'	\D E	\a (\D E)	K^2	INT<if>	int<irf>	<i f>\D E/m	<i r f>\D E	<i r f>	<f r f>	\calV/m	\Gamma								
	MeV		MeV	MeV			1/GeV				GeV	GeV		MeV	errorE	alpha	multip	cornell	rel.1	rel.2	d\G%	error
$2p_0$	4917	$1p$	3457	1460	0.333	1	0.135	-0.562	0.135	0.820	0.562	3.141	1.074	2.0	0.32	0.38	0.028	1.33	0.062	0.22	1.44	3
$3p_0$	5315	$1p$	3457	1858	0.299	1	0.050	-0.202	0.063	0.375	0.202	3.141	1.345	0.5	0.25	0.32	0.006	1.05	0.100	0.28	1.16	0.6
		$2p$	3958	1357	0.345	1	0.113	-0.908	0.105	1.233	0.908	4.658	1.447	1.1	0.34	0.40	0.063	2.15	0.053	0.30	2.24	3
Hybrid		Bottom		Decay																		
$2p_0$	11261	$1p$	9879	1382	0.341	1	0.242	-0.056	**0.069**	**0.078**	0.056	1.985	0.203	**0.5**	0.10	0.40	0.000	0.87	0.005	0.04	0.96	**0.5**
$3p_0$	11525	$1p$	9879	1646	0.315	1	0.110	-0.112	**0.037**	**0.185**	0.112	1.985	0.257	**0.2**	0.09	0.35	0.001	0.73	0.007	0.05	0.81	**0.1**
		$2p$	10234	1291	0.353	1	0.295	0.051	0.078	0.066	0.051	3.030	0.275	0.6	0.11	0.42	0.000	1.45	0.004	0.06	1.51	0.9

Hybrid		Charm		Decay					*	*												
nL_J	E/{E}	n'L'	E'	\D E	\a (\D E)	K^2	INT<if>	int<irf>	<i f>\D E/m	<i r f>\DE	<i r f>	<f r f>	\calV/m	\Gamma								
	MeV		MeV	MeV			1/GeV				GeV	GeV		MeV	errorE	alpha	multip	cornell	rel.1	rel.2	d\G%	error
$1p_1$	4171	$1p$	3457	714	0.513	1	0.944	3.318	0.459	2.369	3.318	3.141	0.567	17	0.65	0.65	0.234	2.72	0.015	0.12	2.88	49
$2p_1$	4556	$1p$	3457	1099	0.385	1	0.291	0.118	0.217	0.129	0.118	3.141	0.829	4	0.42	0.49	0.001	1.77	0.035	0.17	1.89	8
$3p_1$	4912	$1p$	3457	1455	0.333	1	0.124	-0.123	0.123	0.178	0.123	3.141	1.071	1.6	0.32	0.38	0.001	1.33	0.061	0.22	1.44	2.3
		$2p$	3958	954	0.418	1	0.326	0.314	0.211	0.300	0.314	4.658	1.173	4	0.49	0.59	0.004	3.06	0.026	0.24	3.16	13
Hybrid		Bottom		Decay																		
$1p_1$	10772	$1p$	9879	893	0.436	1	0.847	2.029	0.155	1.812	2.029	1.985	0.102	2.1	0.16	0.65	0.137	1.34	0.002	0.02	1.50	3.1
$2p_1$	10995	$1p$	9879	1116	0.382	1	0.438	0.553	0.100	0.617	0.553	1.985	0.148	0.9	0.13	0.48	0.016	1.07	0.003	0.03	1.18	1.1
$3p_1$	11209	$1p$	9879	1330	0.348	1	0.235	0.126	**0.064**	**0.168**	0.126	1.985	0.192	**0.4**	0.11	0.41	0.001	0.90	0.005	0.04	0.99	**0.4**
		$2p$	10234	975	0.413	1	0.441	0.838	0.088	0.818	0.838	3.030	0.210	0.7	0.14	0.57	0.028	1.92	0.002	0.04	2.01	1.4

Hybrid		Charm		Decay							*	*												
nL_J	E/{E}	n'L'	E'	\D E	\a \D E	k^2	INT+<if>	INT-<if>	int<irf>+	int<irf>-	<i f>\D E/m	<i r f>\DE	<i r f>	<f r f>	\calV/m	\Gamma								
	MeV		MeV	MeV			1/GeV	1/GeV					GeV	GeV		MeV	errorE	alpha	multip	cornell	rel.1	rel.2	d\G%	error
$2(s/d)_1$	4394	$1s$	3068	1326	0.35	1		-0.36		-0.25	**0.33**	**0.33**	0.246	2.06	0.640	**11**	0.35	0.41	0.004	0.94	0.051	0.13	1.08	**12**
$2(s/d)_1$	4351	$1s$	2984	1367	0.34	1		-0.36		-0.25	0.34	0.34	0.246	2.06	0.554	**12**	0.00	0.40	0.005	0.91	0.054	0.12	0.99	**12**
$3(s/d)_1$	4678	$1s$	3068	1610	0.32	1		-0.03		-0.35	0.03	0.57	0.354	2.06	0.833	**0.11**	0.29	0.35	0.014	0.77	0.075	0.17	0.90	**0.10**
$3(s/d)_1$	4626	$1s$	2984	1642	0.32	1		-0.03		-0.35	0.03	0.58	0.354	2.06	0.741	**0.12**	0.00	0.35	0.014	0.76	0.078	0.15	0.83	**0.10**
		$2s$	3674	1004	0.41	1		0.40		1.89	0.28	1.90	1.891	3.84	0.948	7	0.46	0.55	0.150	2.38	0.029	0.20	2.49	17
Hybrid		Bottom		Decay																				
$1(s/d)_1$	10704	$1s$	9551	1153	0.375	1		-0.774		-1.238	0.183	1.428	1.238	1.21	0.071	**3.2**	0.12	0.47	0.085	0.60	0.003	0.01	0.78	**2.5**
$2(s/d)_1$	10905	$1s$	9551	1354	0.345	1		-0.489		-0.481	0.136	0.651	0.481	1.21	0.112	**2**	0.10	0.40	0.018	0.51	0.005	0.02	0.66	**1**
		$2s$	10017	888	0.438	1		-0.408		-1.232	0.074	1.094	1.232	2.45	0.133	0.5	0.16	0.65	0.050	1.68	0.002	0.03	1.81	0.9
$3(s/d)_1$	11103	$1s$	9551	1552	0.323	1		-0.175		-0.167	0.056	0.259	0.167	1.21	0.153	**0.3**	0.09	0.36	0.003	0.45	0.006	0.03	0.58	**0.2**
		$2s$	10017	1086	0.387	1		-0.023		0.277	0.005	0.300	0.277	2.45	0.173	0.0	0.13	0.50	0.004	1.38	0.003	0.04	1.47	0.0
		$1d$	10106	997	0.407	1	0.702		1.789		0.143	1.784	1.789	2.62	0.183	1.9	0.14	0.55	0.133	1.61	0.003	0.04	1.71	3.2

* for spin flip <i r f> is just abs(INT<irf>) without angular coefficient K^2, or consequently whn we have two wave-functions. Used for multip
while <i f> = abs(INT<if>) * angular coefficient sqrt(K^2), or consequently whn we have two wave-functions. Used for \Gamma

Decay for spin conserved transitions **green:** **\D E>800** **&** **<i|r|f>\DE<1**

Hybrid		Charm		Decay									
nL_J	E	n'L'	E'	\D E	\a (\D E)	C^2	INT	\Delta/mq	<i r f>\D E	<i r f>	<f r f>	\calV /m	\Gamma
	MeV		MeV	MeV			1/GeV			GeV^-1	GeV^-1		MeV
$1p_0$	4455	$1s$	3068	1387	0.34	0.33	2.20	0.94	1.76	1.27	2.06	0.68	325
		$2s$	3674	781	0.48	0.33	-2.91	0.53	1.31	1.68	3.84	0.80	144
		$3s$	4149	306	1.00	0.33	0.51	0.21	0.09	0.29	5.27	0.90	1
		$4s$	4562										
		$1d$	3762	693	0.53	0.67	3.66	0.47	2.07	2.99	4.05	0.82	347
		$2d$	4209	246	1.00	0.67	-0.28	0.17	0.06	0.22	5.41	0.92	0
		$3d$	4608										
		$4d$	4974										
$2p_0$	4917	$1s$	3068	1849	0.30	0.33	0.51	1.26	0.54	0.29	2.06	1.00	37
		$2s$	3674	1243	0.36	0.33	2.95	0.85	2.12	1.70	3.84	1.11	445
		$3s$	4149	768	0.48	0.33	-4.23	0.52	1.88	2.44	5.27	1.21	291
		$4s$	4562	355	1.00	0.33	0.40	0.24	0.08	0.23	6.53	1.30	1
		$1d$	3762	1155	0.37	0.67	-2.08	0.79	1.96	1.70	4.05	1.14	371
		$2d$	4209	708	0.52	0.67	4.76	0.48	2.75	3.89	5.41	1.23	615
		$3d$	4608	309	1.00	0.67	-0.25	0.21	0.06	0.20	6.63	1.32	0
		$4d$	4974										
$3p_0$	5315	$1s$	3068	2247	0.28	0.33	0.20	1.53	0.26	0.12	2.06	1.27	9
		$2s$	3674	1641	0.32	0.33	0.51	1.12	0.48	0.29	3.84	1.38	27
		$3s$	4149	1166	0.37	0.33	3.73	0.79	2.51	2.15	5.27	1.48	609
		$4s$	4562	753	0.49	0.33	-5.77	0.51	2.51	3.33	6.53	1.57	519
		$1d$	3762	1553	0.32	0.67	-0.16	1.06	0.21	0.13	4.05	1.41	5
		$2d$	4209	1106	0.38	0.67	-3.20	0.75	2.89	2.62	5.41	1.50	789
		$3d$	4608	707	0.52	0.67	6.14	0.48	3.54	5.01	6.63	1.59	1020
		$4d$	4974	341	1.00	0.67	-0.96	0.23	0.27	0.79	7.76	1.67	5

Decay for spin conserved transitions **green:** **\D E>800** **&** **<i|r|f>\DE<1**

Hybrid		Bottom		Decay									
nL_J	E/{E}	n'L'	E'	\D E	\a (\D E)	C^2	INT	\Delta/mq	<i r f> \D E	<i r f>	<f r f>	\calV/m	\Gamma
	MeV		MeV	MeV			1/GeV			GeV^-1	GeV^-1		MeV
$1p_0$	10977	$1s$	9551	1426	0.34	0.33	1.22	0.29	1.00	0.70	1.21	0.13	107
		$2s$	10017	960	0.42	0.33	-2.16	0.20	1.19	1.24	2.45	0.15	127
		$3s$	10355	622	0.58	0.33	0.60	0.13	0.21	0.34	3.43	0.17	4
		$4s$	10643	334	1.00	0.33	0.05	0.07	0.01	0.03	4.29	0.19	0
		$1d$	10106	871	0.44	0.67	2.50	0.18	1.78	2.04	2.62	0.16	271
		$2d$	10416	561	0.64	0.67	-0.50	0.11	0.23	0.41	3.55	0.17	4
		$3d$	10689	288	1.00	0.67	-0.06	0.06	0.01	0.05	4.38	0.19	0
		$4d$	10939	38	0.00	0.67	-0.02	0.01	0.00	0.02	5.14	0.21	0
$2p_0$	11261	$1s$	9551	1710	0.31	0.33	0.47	0.35	0.46	0.27	1.21	0.19	25
		$2s$	10017	1244	0.36	0.33	1.39	0.25	1.00	0.80	2.45	0.21	99
		$3s$	10355	906	0.43	0.33	-3.25	0.19	1.70	1.88	3.43	0.23	252
		$4s$	10643	618	0.58	0.33	0.99	0.13	0.35	0.57	4.29	0.24	10
		$1d$	10106	1155	0.37	0.67	-1.06	0.24	1.00	0.86	2.62	0.22	95
		$2d$	10416	845	0.45	0.67	3.45	0.17	2.38	2.82	3.55	0.23	482
		$3d$	10689	572	0.63	0.67	-0.83	0.12	0.39	0.68	4.38	0.25	12
		$4d$	10939	322	1.00	0.67	-0.17	0.07	0.04	0.14	5.14	0.27	0
$3p_0$	11525	$1s$	9551	1974	0.29	0.33	0.25	0.40	0.29	0.15	1.21	0.24	11
		$2s$	10017	1508	0.33	0.33	0.61	0.31	0.53	0.35	2.45	0.26	31
		$3s$	10355	1170	0.37	0.33	1.56	0.24	1.06	0.90	3.43	0.28	108
		$4s$	10643	882	0.44	0.33	-3.99	0.18	2.03	2.30	4.29	0.30	356
		$1d$	10106	1419	0.34	0.67	-0.30	0.29	0.35	0.24	2.62	0.27	13
		$2d$	10416	1109	0.38	0.67	-1.44	0.23	1.30	1.17	3.55	0.29	159
		$3d$	10689	836	0.46	0.67	4.12	0.17	2.82	3.37	4.38	0.30	672
		$4d$	10939	586	0.61	0.67	-0.70	0.12	0.34	0.57	5.14	0.32	9

Decay for spin conserved transitions **green:** **\D E>800** **&** **<i|r|f>\DE<1**

Hybrid nL_J	E/{E} MeV	Charm n'L'	E' MeV	Decay \D E MeV	\a (\D E)	C^2	INT 1/GeV	\Delta/mq	<i r f>\D E	<i r f> GeV^-1	<f r f> GeV^-1	\calV/m	\Gamma MeV
$1p_1$	4171	$1s$	3068	1103	0.384	0.333	2.058	0.750	1.311	1.188	2.06	0.488	162
		$2s$	3674	497	0.744	0.333	-3.423	0.338	0.982	1.976	3.84	0.603	79
		$3s$	4149	22	0.000	0.333	1.111	0.015	0.014	0.641	5.27	0.705	0
		$4s$	4562										
		$1d$	3762	409	1.000	0.667	3.985	0.278	1.331	3.254	4.05	0.630	161
		$2d$	4209										
		$3d$	4608										
		$4d$	4974										
$2p_1$	4556	$1s$	3068	1488	0.330	0.333	0.816	1.012	0.701	0.471	2.06	0.750	54
		$2s$	3674	882	0.440	0.333	2.112	0.600	1.076	1.220	3.84	0.865	100
		$3s$	4149	407	1.000	0.333	-4.990	0.277	1.173	2.881	5.27	0.967	124
		$4s$	4562										
		$1d$	3762	794	0.473	0.667	-1.263	0.540	0.819	1.031	4.05	0.892	56
		$2d$	4209	347	1.000	0.667	5.343	0.236	1.514	4.362	5.41	0.986	177
		$3d$	4608										
		$4d$	4974										
$3p_1$	4912	$1s$	3068	1844	0.300	0.333	0.396	1.254	0.422	0.229	2.06	0.992	22
		$2s$	3674	1238	0.361	0.333	0.988	0.842	0.707	0.571	3.84	1.107	50
		$3s$	4149	763	0.487	0.333	2.241	0.519	0.987	1.294	5.27	1.209	81
		$4s$	4562	350	1.000	0.333	-6.278	0.238	1.269	3.624	6.53	1.300	125
		$1d$	3762	1150	0.375	0.667	-0.462	0.782	0.434	0.377	4.05	1.134	18
		$2d$	4209	703	0.520	0.667	-1.706	0.478	0.979	1.393	5.41	1.229	78
		$3d$	4608	304	1.000	0.667	6.546	0.207	1.625	5.345	6.63	1.316	178
		$4d$	4974										

Decay for spin conserved transitions **green:** **\D E>800** **&** **<i|r|f>\DE<1**

Hybrid nL_J	E/{E} MeV	Bottom n'L'	E' MeV	Decay \D E MeV	\a (\D E)	C^2	INT 1/GeV	\Delta/mq	<i r f >\D E	<i r f> GeV^-1	<f r f> GeV^-1	\calV /m	\Gamma MeV
$1p_1$	10772	$1s$	9551	1221	0.364	0.333	1.027	0.250	0.724	0.593	1.21	0.155	52
		$2s$	10017	755	0.491	0.333	-2.473	0.155	1.078	1.428	2.45	0.165	96
		$3s$	10355	417	0.976	0.333	1.496	0.085	0.360	0.864	3.43	0.281	12
		$4s$	10643	129	1.000	0.333	-0.220	0.026	0.016	0.127	4.29	0.704	0
		$1d$	10106	666	0.544	0.667	2.700	0.136	1.468	2.204	2.62	0.137	174
		$2d$	10416	356	1.000	0.667	-1.465	0.073	0.426	1.196	3.55	0.263	14
		$3d$	10689	83	1.000	0.667	0.160	0.017	0.011	0.131	4.38	0.702	0
		$4d$	10939										
$2p_1$	10995	$1s$	9551	1444	0.334	0.333	0.659	0.296	0.550	0.381	1.21	0.256	32
		$2s$	10017	978	0.412	0.333	0.459	0.200	0.259	0.265	2.45	0.413	6
		$3s$	10355	640	0.564	0.333	-3.294	0.131	1.217	1.902	3.43	0.250	119
		$4s$	10643	352	1.000	0.333	2.338	0.072	0.475	1.350	4.29	0.344	18
		$1d$	10106	889	0.438	0.667	-0.175	0.182	0.127	0.143	2.62	0.595	1.4
		$2d$	10416	579	0.622	0.667	3.458	0.119	1.635	2.823	3.55	0.214	214
		$3d$	10689	306	1.000	0.667	-2.244	0.063	0.561	1.832	4.38	0.323	21
		$4d$	10939	56	0.000	0.667	0.260	0.011	0.012	0.212	5.14	0.650	0
$3p_1$	11209	$1s$	9551	1658	0.314	0.333	0.412	0.340	0.394	0.238	1.21	0.384	18
		$2s$	10017	1192	0.368	0.333	0.605	0.244	0.416	0.349	2.45	0.408	17
		$3s$	10355	854	0.450	0.333	0.123	0.175	0.061	0.071	3.43	1.039	0.3
		$4s$	10643	566	0.637	0.333	-3.917	0.116	1.280	2.261	4.29	0.333	131
		$1d$	10106	1103	0.384	0.667	-0.285	0.226	0.256	0.232	2.62	0.502	6
		$2d$	10416	793	0.474	0.667	-0.055	0.163	0.036	0.045	3.55	1.454	0.11
		$3d$	10689	520	0.702	0.667	4.093	0.107	1.738	3.342	4.38	0.288	245
		$4d$	10939	270	1.000	0.667	-2.922	0.055	0.644	2.385	5.14	0.387	25

Decay for spin conserved transitions green: \D E>800 & <i|r|f>\DE<1

Hybrid nL_J	E/{E} MeV	Charm n'L'	E' MeV	Decay \D E MeV	\a \D E	C+^2	C-^2	INT+ 1/GeV	INT- 1/GeV	\Delta/mq	< i r f >\D E	\Gamma MeV
$1(s/d)_1$	4028	$1p$	3457	571	0.63	0.40	1.00	-0.64	-2.95	0.39	1.92	232
		$2p$	3958	70	0.00	0.40	1.00	0.53	0.97	0.05	0.09	0
		$3p$	4388									
		$4p$	4774									
		$1f$	4029									
		$2f$	4441									
		$3f$	4817									
		$4f$	5807									
$2(s/d)_1$	4394	$1p$	3457	937	0.42	0.40	1.00	1.35	0.87	0.64	1.62	115
		$2p$	3958	436	0.90	0.40	1.00	-2.12	-3.88	0.30	2.28	280
		$3p$	4388	6	0.00	0.40	1.00	0.88	1.36	0.00	0.01	0
		$4p$	4774									
		$1f$	4029	365	1.00	0.60		2.42		0.25	0.68	38
		$2f$	4441									
		$3f$	4817									
		$4f$	5807									
$3(s/d)_1$	4678	$1p$	3457	1221	0.36	0.40	1.00	2.92	-1.05	0.83	0.98	664
		$2p$	3958	720	0.51	0.40	1.00	-2.16	2.25	0.49	0.63	293
		$3p$	4388	290	1.00	0.40	1.00	-0.48	-1.08	0.20	0.40	7
		$4p$	4774									
		$1f$	4029	649	0.56	0.60		3.62		0.44	1.82	266
		$2f$	4441	237	1.00	0.60		0.59		0.16	0.11	1
		$3f$	4817									
		$4f$	5807									

Decay for spin conserved transitions green: \D E>800 & <i|r|f>\DE<1

Hybrid nL_J	E/{E} MeV	Bottom n'L'	E' MeV	Decay \D E MeV	\a \D E	C+	C-	INT+ 1/GeV	INT- 1/GeV	\Delta/mq	<I r f>\D E	<i r f> GeV^-1	<f r f> GeV^-1	\calV/m	\Gamma MeV
$1(s/d)_1$	10704	$1p$	9879	825	0.460	0.4	1.0	-0.478	-1.979	0.172	1.882	2.281	1.985	0.088	230
		$2p$	10234	470	0.804	0.4	1.0	0.591	1.226	0.098	0.752	1.599	3.030	0.107	30
		$3p$	10532	172	1.000	0.4	1.0	-0.151	-0.166	0.036	0.045	0.261	3.923	0.125	0
		$4p$	10798												
		$1f$	10297	407	1.000	0.6		-0.757		0.085	0.239	0.586	3.177	0.112	5
		$2f$	10579	125	1.000	0.6		0.167		0.026	0.016	0.129	4.030	0.129	0
		$3f$	10835												
		$4f$	11072												
$2(s/d)_1$	10905	$1p$	9879	1026	0.400	0.4	1.0	0.680	0.022	0.214	0.464	0.452	1.985	1.985	18
		$2p$	10234	671	0.541	0.4	1.0	-1.492	-2.441	0.140	2.271	3.385	3.030	3.030	249
		$3p$	10532	373	1.000	0.4	1.0	1.064	1.760	0.078	0.908	2.433	3.923	3.923	41
		$4p$	10798	107	1.000	0.4	1.0	-0.199	-0.236	0.022	0.039	0.363	4.725	4.725	0
		$1f$	10297	608	0.592	0.6		1.544		0.127	0.727	1.196	3.177	3.177	42
		$2f$	10579	326	1.000	0.6		-1.201		0.068	0.303	0.930	4.030	4.030	7
		$3f$	10835	70	0.000	0.6		0.192		0.015	0.010	0.149	4.809	4.809	0
		$4f$	11072												
$3(s/d)_1$	11103	$1p$	9879	1224	0.363	0.4	1.0	1.485	-0.194	0.255	0.911	0.745	1.985	0.170	136
		$2p$	10234	869	0.444	0.4	1.0	-0.924	0.938	0.181	0.307	0.353	3.030	0.188	79
		$3p$	10532	571	0.631	0.4	1.0	-1.305	-2.591	0.119	1.951	3.416	3.923	0.206	193
		$4p$	10798	305	1.000	0.4	1.0	1.107	1.644	0.064	0.715	2.344	4.725	0.223	20
		$1f$	10297	806	0.468	0.6		1.681		0.168	1.050	1.302	3.177	0.194	92
		$2f$	10579	524	0.695	0.6		1.322		0.109	0.537	1.024	4.030	0.211	23
		$3f$	10835	268	1.000	0.6		-1.196		0.056	0.248	0.926	4.809	0.227	4
		$4f$	11072	31	0.000	0.6		0.145		0.006	0.003	0.112	5.535	0.242	0

Decay for spin flipped transition Hybrid spin 0 **green:** **\D E>800 & <i|f>\DE<1 & <i|r|f>\DE<2**

Hybrid nL_J	E/{E} MeV	Charm n'L'	E' MeV	Decay \D E MeV	\a (\D E	K^2	INT<> 1/GeV	INT<r>	<i | f>\D E/m	<i|r|f>\DE	**<i r f> GeV^-1**	**<f r f> GeV^-1**	**\calV/m**	\Gamma MeV
$1p_0$	4455	$1p$	3457	998	0.407	0.33	0.988	3.269	0.671	3.262	3.269	3.141	0.760	14
		$1p$	3457	998	0.407	1.00	0.988	3.269	0.671	3.262	3.269	3.141	0.760	41
		$1p$	3457	998	0.407	1.67	0.988	3.269	0.866	3.262	3.269	3.141	0.760	68
		$2p$	3958	497	0.744	3	-0.143		0.084			4.658	0.862	1
		$3p$	4388	67	0.000	3	-0.035		0.003			5.969	0.955	0
		$4p$	4774											
$2p_0$	4917	$1p$	3457	1460	0.333	3	0.135	-0.562	0.233	0.820	0.562	3.141	1.074	6
		$2p$	3958	959	0.417	0.33	0.977	4.637	0.368	4.447	4.637	4.658	1.176	12
		$2p$	3958	959	0.417	1.00	0.977	4.637	0.637	4.447	4.637	4.658	1.176	36
		$2p$	3958	959	0.417	1.67	0.977	4.637	0.823	4.447	4.637	4.658	1.176	60
		$3p$	4388	529	0.688	3	-0.133		0.083		0.000	5.969	1.269	1
		$4p$	4774	143	1.000	3	-0.032		0.005		0.000	7.153	1.354	0
$3p_0$	5315	$1p$	3457	1858	0.299	3	0.050	-0.202	0.109	0.375	0.202	3.141	1.345	1.5
		$2p$	3958	1357	0.345	3	0.113	-0.908	0.181	1.233	0.908	4.658	1.447	3
		$3p$	4388	927	0.426	0.33	0.962	5.995	0.350	5.558	5.995	5.969	1.540	11
		$3p$	4388	927	0.426	1.00	0.962	5.995	0.606	5.558	5.995	5.969	1.540	32
		$3p$	4388	927	0.426	1.67	0.962	5.995	0.783	5.558	5.995	5.969	1.540	54
		$4p$	4774	541	0.670	3	-0.222		0.141		0.000	7.153	1.625	2

Decay for spin flipped transition Hybrid spin 0 **green:** **\D E>800 & <i|f>\DE<1 & <i|r|f>\DE<2**

Hybrid nL_J	E/{E} MeV	Bottom n'L'	E' MeV	Decay \D E MeV	\a (\D E	K^2	INT 1/GeV	INT<r>	<i | f>\D E/m	<i|r|f>\DE	**<i r f> GeV^-1**	**<f r f> GeV^-1**	**\calV/m**	\Gamma MeV
$1p_0$	10977	$1p$	9879	1098	0.385	3	0.960	2.101	0.374	2.307	2.101	1.985	0.144	13
		$2p$	10234	743	0.497	3	-0.274		0.072		0.000	3.030	0.162	0
		$3p$	10532	445	0.874	3	-0.032		0.005		0.000	3.923	0.180	0
		$4p$	10798	179	1.000	3	-0.018		0.001		0.000	4.725	0.198	0
$2p_0$	11261	$1p$	9879	1382	0.341	3	0.242	-0.056	0.119	0.078	0.056	1.985	0.203	1.5
		$2p$	10234	1027	0.400	3	0.896	2.927	0.327	3.006	2.927	3.030	0.221	10
		$3p$	10532	729	0.505	3	-0.357		0.092		0.000	3.923	0.239	1
		$4p$	10798	463	0.822	3	-0.047		0.008		0.000	4.725	0.256	0
$3p_0$	11525	$1p$	9879	1646	0.315	3	0.110	-0.112	0.064	0.185	0.112	1.985	0.257	0.5
		$2p$	10234	1291	0.353	3	0.295	0.051	0.135	0.066	0.051	3.030	0.275	2
		$3p$	10532	993	0.408	3	0.875	3.579	0.308	3.554	3.579	3.923	0.293	9
		$4p$	10798	727	0.506	3	-0.332		0.086		0.000	4.725	0.310	1

Decay for spin flipped transitic Hybrid spin 0 **green:** **\D E>800 & <i|f>\DE<1 & <i|r|f>\DE<2**

Hybrid nL_J	E/{E} MeV	Charm n'L'	E' MeV	Decay \D E MeV	\a (\D E)	K^2	INT<> 1/GeV	iNT<r>	<i | f>\D E/m	<i|r|f>\DE	**<i r f> GeV^-1**	**<f r f> GeV^-1**	**\calV/m**	\Gamma MeV
$1p_1$	4171	$1p$	3457	714	0.513	0.33	0.944	3.318	0.265	2.369	3.318	3.141	0.567	6
		$1p$	3457	714	0.513	1.00	0.944	3.318	0.459	2.369	3.318	3.141	0.567	17
		$1p$	3457	714	0.513	1.67	0.944	3.318	0.592	2.369	3.318	3.141	0.567	29
		$2p$	3958	213	1.000	3	-0.326		0.082		0.000	4.658	0.669	0
		$3p$	4388											
		$4p$	4774											
$2p_1$	4556	$1p$	3457	1099	0.385	3	0.291	0.118	0.376	0.129	0.118	3.141	0.829	13
		$2p$	3958	598	0.601	3	0.864		0.609		0.000	4.658	0.931	30
		$3p$	4388	168	1.000	3	-0.402		0.080		0.000	5.969	1.024	0
		$4p$	4774											
$3p_1$	4912	$1p$	3457	1455	0.333	3	0.124	-0.123	0.213	0.178	0.123	3.141	1.071	5
		$2p$	3958	954	0.418	3	0.326	0.314	0.366	0.300	0.314	4.658	1.173	12
		$3p$	4388	524	0.695	3	0.819		0.505		0.000	5.969	1.266	21
		$4p$	4774	138	1.000	3	-0.443		0.072		0.000	7.153	1.351	0

Decay for spin flipped transitic Hybrid spin 0 **green:** **\D E>800 & <i|f>\DE<1 & <i|r|f>\DE<2**

Hybrid nL_J	E/{E} MeV	Bottom n'L'	E' MeV	Decay \D E MeV	\a (\D E)	K^2	INT 1/GeV	iNT<r>	<i | f>\D E/m	<i|r|f>\DE	**<i r f> GeV^-1**	**<f r f> GeV^-1**	**\calV/m**	\Gamma MeV
$1p_1$	10772	$1p$	9879	893	0.436	3	0.847	2.029	0.269	1.812	2.029	3.141	0.042	6
		$2p$	10234	538	0.674	3	-0.525		0.100		0.000	4.658	0.043	1
		$3p$	10532	240	1.000	3	0.063		0.005		0.000	5.969	0.044	0
		$4p$	10798											
$2p_1$	10995	$1p$	9879	1116	0.382	3	0.438	0.553	0.173	0.617	0.553	3.141	0.088	3
		$2p$	10234	761	0.488	3	0.630		0.170		0.000	4.658	0.089	2
		$3p$	10532	463	0.822	3	-0.630		0.104		0.000	5.969	0.090	1
		$4p$	10798	197	1.000	3	0.087		0.006		0.000	7.153	0.091	0
$3p_1$	11209	$1p$	9879	1330	0.348	3	0.235	0.126	0.111	0.168	0.126	3.141	0.132	1.3
		$2p$	10234	975	0.413	3	0.441	0.838	0.153	0.818	0.838	4.658	0.133	2.1
		$3p$	10532	677	0.536	3	0.512		0.123		0.000	5.969	0.134	1
		$4p$	10798	411	1.000	3	-0.681		0.099		0.000	7.153	0.135	1

Decay for spin flipped transitions				Hybrid spin 0			green:	\D E>800 &		<i|f>\DE<1 &			<i|r|f>\DE<2			
Hybrid		Charm		Decay												
nL_J	E/{E}	n'L'	E'	\D E	\a (\D E	K^2	INT+	INT-	INT<r>	INT<r>-	<i | f>\D E/m	<i|r|f>\DE	<i r f>	<f r f>	\calV/m	\Gamma
	MeV		MeV	MeV			1/GeV	1/GeV					GeV^-1	GeV^-1		MeV
$1(s/d)_1$	4028	$1s$	3068	960	0.42	3.00		-0.91		-2.21	1.03	2.12	2.207	2.06	0.391	94
		$2s$	3674	354	1.00	3.00		0.37			0.15		0.000	3.84	0.506	2
		$3s$	4149													
		$4s$	4562													
		$1d$	3762	266	1.00	3.00	-0.19				0.06		0.000	4.05	0.533	0
		$2d$	4209													
		$3d$	4608													
		$4d$	4974													
$2(s/d)_1$	4394	$1s$	3068	1326	0.35	3.00		-0.36		-0.25	0.56	0.33	0.246	2.06	0.640	33
		$2s$	3674	720	0.51	3.00		-0.69			0.59		0.000	3.84	0.755	28
		$3s$	4149	245	1.00	3.00		0.39			0.11		0.000	5.27	0.857	1
		$4s$	4562													
		$1d$	3762	632	0.57	3.00	0.42				0.31		0.000	4.05	0.782	8
		$2d$	4209	185	1.00	3.00	-0.24				0.05		0.000	5.41	0.876	0
		$3d$	4608													
		$4d$	4974													
$3(s/d)_1$	4678	$1s$	3068	1610	0.32	3.00		-0.03		-0.35	0.05	0.57	0.354	2.06	0.833	0.3
		$2s$	3674	1004	0.41	3.00		0.40		1.89	0.48	1.90	1.891	3.84	0.948	21
		$3s$	4149	529	0.69	3.00		-0.24			0.15		0.000	5.27	1.050	2
		$4s$	4562	116	1.00	3.00		0.03			0.00		0.000	6.53	1.141	0
		$1d$	3762	916	0.43	0.60	0.88		3.54		0.42	3.24	3.537	4.05	0.975	16
		$1d$	3762	916	0.43	1.00	0.88		3.54		0.55	3.24	3.537	4.05	0.975	26
		$1d$	3762	916	0.43	1.40	0.88		3.54		0.65	3.24	3.537	4.05	0.975	37
		$2d$	4209	469	0.81	3.00	0.03				0.02		0.000	5.41	1.069	0
		$3d$	4608	70	0.00	3.00	-0.06				0.01		0.000	6.63	1.157	0
		$4d$	4974													

Decay for spin flipped transitions				Hybrid spin 0			green:	\D E>800 &		<i|f>\DE<1 &			<i|r|f>\DE<2			
Hybrid		Bottom		Decay												
nL_J	E/{E}	n'L'	E'	\D E	\a (\D E	K^2	INT+	INT-	INT<r>	INT<r>-	<i | f>\D E/m	<i|r|f>\DE	<i r f>	<f r f>	\calV/m	\Gamma
	MeV		MeV	MeV			1/GeV	1/GeV					GeV^-1	GeV^-1		MeV
$1(s/d)_1$	10704	$1s$	9551	1153	0.37	3.00		-0.77		-1.24	0.32	1.43	1.238	1.21	0.071	9.65
		$2s$	10017	687	0.53	3.00		0.58			0.14		0.000	2.45	0.091	1.61
		$3s$	10355	349	1.00	3.00		-0.07			0.01		0.000	3.43	0.112	0.01
		$4s$	10643	61	0.00	3.00		0.02			0.00		0.000	4.29	0.130	0.00
		$1d$	10106	598	0.60	3.00	-0.23				0.05		0.000	2.62	0.101	0.20
		$2d$	10416	288	1.00	3.00	0.07				0.01		0.000	3.55	0.119	0.00
		$3d$	10689	15	0.00	3.00	0.00				0.00		0.000	4.38	0.135	0.00
		$4d$	10939													
$2(s/d)_1$	10905	$1s$	9551	1354	0.34	3.00		-0.49		-0.48	0.24	0.65	0.481	1.21	0.112	5.74
		$2s$	10017	888	0.44	3.00		-0.41		-1.23	0.13	1.09	1.232	2.45	0.133	1.43
		$3s$	10355	550	0.66	3.00		0.59			0.12		0.000	3.43	0.153	1.07
		$4s$	10643	262	1.00	3.00		-0.08			0.01		0.000	4.29	0.171	0.00
		$1d$	10106	799	0.47	3.00	0.35				0.10		0.000	2.62	0.142	0.82
		$2d$	10416	489	0.76	3.00	-0.33				0.06		0.000	3.55	0.160	0.26
		$3d$	10689	216	1.00	3.00	0.07				0.01		0.000	4.38	0.177	0.00
		$4d$	10939													
$3(s/d)_1$	11103	$1s$	9551	1552	0.32	3.00		-0.18		-0.17	0.10	0.26	0.167	1.21	0.153	1.04
		$2s$	10017	1086	0.39	3.00		-0.02		0.28	0.01	0.30	0.277	2.45	0.173	0.007
		$3s$	10355	748	0.49	3.00		-0.40			0.11		0.000	3.43	0.194	0.95
		$4s$	10643	460	0.83	3.00		0.45			0.07		0.000	4.29	0.212	0.46
		$1d$	10106	997	0.41	3.00	0.70		1.79		0.25	1.78	1.789	2.62	0.183	5.56
		$2d$	10416	687	0.53	3.00	0.13				0.03		0.000	3.55	0.200	0.08
		$3d$	10689	414	0.99	3.00	-0.29				0.04		0.000	4.38	0.217	0.16
		$4d$	10939	164	1.00	3.00	0.04				0.00		0.000	5.14	0.233	0.00

Decay for spin flipped transitions Hybrid spin 1 **green:** **\D E>800 &** **<i|f>\DE<1 &** **<i|r|f>\DE<2**

Hybrid nL_J	E/{E} MeV	Charm n'L'	E' MeV	Decay \D E MeV	\a (\D E)	K^2	INT 1/GeV	int<r>	<i | f>\D E/m	<i|r|f>\DE	**<i r f> GeV^-1**	**<f r f> GeV^-1**	**\calV/m**	\Gamma MeV
$1p_0$	4455	$1p$	3457	998	0.407	1	0.988	3.269	0.671	3.262	3.269	3.141	0.760	41
		$2p$	3958	497	0.744	1	-0.143				0.000	4.658	0.862	
		$3p$	4388	67	0.000	1	-0.035				0.000	5.969	0.955	
		$4p$	4774											
$2p_0$	4917	$1p$	3457	1460	0.333	1	0.135	-0.562	0.135	0.820	0.562	3.141	1.074	2.0
		$2p$	3958	959	0.417	1	0.977	4.637	0.637	4.447	4.637	4.658	1.176	36
		$3p$	4388	529	0.688	1	-0.133				0.000	5.969	1.269	
		$4p$	4774	143	1.000	1	-0.032				0.000	7.153	1.354	
$3p_0$	5315	$1p$	3457	1858	0.299	1	0.050	-0.202	0.063	0.375	0.202	3.141	1.345	0.5
		$2p$	3958	1357	0.345	1	0.113	-0.908	0.105	1.233	0.908	4.658	1.447	1.1
		$3p$	4388	927	0.426	1	0.962	5.995	0.606	5.558	5.995	5.969	1.540	32
		$4p$	4774	541	0.670	1	-0.222		0.082		0.000	7.153	1.625	

Decay for spin flipped transitions Hybrid spin 1 **green:** **\D E>800 &** **<i|f>\DE<1 &** **<i|r|f>\DE<2**

Hybrid nL_J	E/{E} MeV	Bottom n'L'	E' MeV	Decay \D E MeV	\a (\D E)	K^2	INT 1/GeV	int<r>	<i | f>\D E/m	<i|r|f>\DE	**<i r f> GeV^-1**	**<f r f> GeV^-1**	**\calV/m**	\Gamma MeV
$1p_0$	10977	$1p$	9879	1098	0.385	1	0.960	2.101	0.216	2.307	2.101	1.985	0.144	4.4
		$2p$	10234	743	0.497	1	-0.274	-1.438	0.042	1.068	1.438	3.030	0.162	0.1
		$3p$	10532	445	0.874	1	-0.032				0.000	3.923	0.180	
		$4p$	10798	179	1.000	1	-0.018				0.000	4.725	0.198	
$2p_0$	11261	$1p$	9879	1382	0.341	1	0.242	-0.056	0.069	0.078	0.056	1.985	0.203	0.5
		$2p$	10234	1027	0.400	1	0.896	2.927	0.189	3.006	2.927	3.030	0.221	3.2
		$3p$	10532	729	0.505	1	-0.357	-2.268	0.053	1.653	2.268	3.923	0.239	0.2
		$4p$	10798	463	0.822	1	-0.047				0.000	4.725	0.256	
$3p_0$	11525	$1p$	9879	1646	0.315	1	0.110	-0.112	0.037	0.185	0.112	1.985	0.257	0.2
		$2p$	10234	1291	0.353	1	0.295	0.051	0.078	0.066	0.051	3.030	0.275	0.6
		$3p$	10532	993	0.408	1	0.875	3.579	0.178	3.554	3.579	3.923	0.293	2.9
		$4p$	10798	727	0.506	1	-0.332				0.000	4.725	0.310	

Decay for spin flipped transitior Hybrid spin 1 **green: \D E>800 & <i|f>\DE<1 & <i|r|f>\DE<2**

Hybrid		Charm		Decay										
nL_J	E/{E}	n'L'	E'	\D E	\a (\D E)	K^2	INT	int<r>	<i | f>\D E/m	<i|r|f>\DE	**<i r f>**	**<f r f>**	**\calV/m**	\Gamma
	MeV		MeV	MeV			1/GeV				**GeV^-1**	**GeV^-1**		MeV
$1p_1$	4171	$1p$	3457	714	0.513	1	0.944	3.318	0.459	2.369	3.318	3.141	0.567	17
		$2p$	3958	213	1.000	1	-0.326		0.047		0.000	4.658	0.669	0
		$3p$	4388											
		$4p$	4774											
$2p_1$	4556	$1p$	3457	1099	0.385	1	0.291	0.118	0.217	0.129	0.118	3.141	0.829	4
		$2p$	3958	598	0.601	1	0.864		0.352		0.000	4.658	0.931	10
		$3p$	4388	168	1.000	1	-0.402		0.046		0.000	5.969	1.024	0
		$4p$	4774											
$3p_1$	4912	$1p$	3457	1455	0.333	1	0.124	-0.123	0.123	0.178	0.123	3.141	1.071	1.6
		$2p$	3958	954	0.418	1	0.326	0.314	0.211	0.300	0.314	4.658	1.173	4
		$3p$	4388	524	0.695	1	0.819		0.292		0.000	5.969	1.266	7
		$4p$	4774	138	1.000	1	-0.443		0.042		0.000	7.153	1.351	0

Decay for spin flipped transitior Hybrid spin 1 **green: \D E>800 & <i|f>\DE<1 & <i|r|f>\DE<2**

Hybrid		Bottom		Decay										
nL_J	E/{E}	n'L'	E'	\D E	\a (\D E)	K^2	INT	int<r>	<i | f>\D E/m	<i|r|f>\DE	**<i r f>**	**<f r f>**	**\calV/m**	\Gamma
	MeV		MeV	MeV			1/GeV				**GeV^-1**	**GeV^-1**		MeV
$1p_1$	10772	$1p$	9879	893	0.436	1	0.847	2.029	0.155	1.812	2.029	1.985	0.102	2.1
		$2p$	10234	538	0.674	1	-0.525		0.058		0.000	3.030	0.120	0.3
		$3p$	10532	240	1.000	1	0.063		0.003		0.000	3.923	0.138	0.0
		$4p$	10798											
$2p_1$	10995	$1p$	9879	1116	0.382	1	0.438	0.553	0.100	0.617	0.553	1.985	0.148	0.9
		$2p$	10234	761	0.488	1	0.630		0.098		0.000	3.030	0.166	0.8
		$3p$	10532	463	0.822	1	-0.630		0.060		0.000	3.923	0.184	0.3
		$4p$	10798	197	1.000	1	0.087		0.004		0.000	4.725	0.201	0.0
$3p_1$	11209	$1p$	9879	1330	0.348	1	0.235	0.126	0.064	0.168	0.126	1.985	0.192	0.4
		$2p$	10234	975	0.413	1	0.441	0.838	0.088	0.818	0.838	3.030	0.210	0.7
		$3p$	10532	677	0.536	1	0.512		0.071		0.000	3.923	0.228	0.4
		$4p$	10798	411	1.000	1	-0.681		0.057		0.000	4.725	0.245	0.3

Decay for spin fliped transitions Hybrid spin 1 **green:** **\D E>800 & <i|f>\DE<1 & <i|r|f>\DE<2**

Hybrid		Charm		Decay												
nL_J	E/{E} MeV	n'L'	E' MeV	\D E MeV	\a \D E	k^2	INT+ 1/GeV	INT- 1/GeV	int<r>+	int<r>-	<i | f>\D E/m	<i|r|f>\DE	<i r f> GeV^-1	<f r f> GeV^-1	\calV/m	\Gamma MeV
$1(s/d)_1$	4028	$1s$	3068	960	0.42	1		-0.91		-2.21	0.59	2.12	2.207	2.06	0.391	31
		$2s$	3674	354	1.00	1		0.37			0.09		0.000	3.84	0.506	1
		$3s$	4149													
		$4s$	4562													
		$1d$	3762	266	1.00	1	-0.19				0.04		0.000	4.05	0.533	0
		$2d$	4209													
		$3d$	4608													
		$4d$	4974													
$2(s/d)_1$	4394	$1s$	3068	1326	0.35	1		-0.36		-0.25	0.33	0.33	0.246	2.06	0.640	11
		$2s$	3674	720	0.51	1		-0.69			0.34		0.000	3.84	0.755	9
		$3s$	4149	245	1.00	1		0.39			0.06		0.000	5.27	0.857	0
		$4s$	4562													
		$1d$	3762	632	0.57	1	0.42				0.18		0.000	4.05	0.782	3
		$2d$	4209	185	1.00	1	-0.24				0.03		0.000	5.41	0.876	0
		$3d$	4608													
		$4d$	4974													
$3(s/d)_1$	4678	$1s$	3068	1610	0.32	1		-0.03		-0.35	0.03	0.57	0.354	2.06	0.833	0.11
		$2s$	3674	1004	0.41	1		0.40		1.89	0.28	1.90	1.891	3.84	0.948	7
		$3s$	4149	529	0.69	1		-0.24			0.09		0.000	5.27	1.050	1
		$4s$	4562	116	1.00	1		0.03			0.00		0.000	6.53	1.141	0
		$1d$	3762	916	0.43	1	0.88		3.54		0.55	3.24	3.537	4.05	0.975	26
		$2d$	4209	469	0.81	1	0.03				0.01		0.000	5.41	1.069	0
		$3d$	4608	70	0.00	1	-0.06				0.00		0.000	6.63	1.157	0
		$4d$	4974													

Decay for spin fliped transitions Hybrid spin 1 **green:** **\D E>800 & <i|f>\DE<1 & <i|r|f>\DE<2**

Hybrid		Bottom		Decay												
nL_J	E/{E} MeV	n'L'	E' MeV	\D E MeV	\a \D E	k^2	INT+ 1/GeV	INT- 1/GeV	int<r>+	int<r>-	<i | f>\D E/m	<i|r|f>\DE	<i r f> GeV	<f r f> GeV	\calV GeV	\Gamma MeV
$1(s/d)_1$	10704	$1s$	9551	1153	0.375	1		-0.774		-1.238	0.183	1.428	1.238	1.21	0.071	3.2
		$2s$	10017	687	0.530	1		0.578			0.081		0.000	2.45	0.091	0.5
		$3s$	10355	349	1.000	1		-0.068			0.005		0.000	3.43	0.112	0.0
		$4s$	10643	61	0.000	1		0.018			0.000		0.000	4.29	0.130	0.0
		$1d$	10106	598	0.601	1	-0.233				0.029		0.000	2.62	0.101	0.1
		$2d$	10416	288	1.000	1	0.066				0.004		0.000	3.55	0.119	0.0
		$3d$	10689	15	0.000	1	0.005				0.000		0.000	4.38	0.135	0.0
		$4d$	10939													
$2(s/d)_1$	10905	$1s$	9551	1354	0.345	1		-0.489		-0.481	0.136	0.651	0.481	1.21	0.112	1.9
		$2s$	10017	888	0.438	1		-0.408		-1.232	0.074	1.094	1.232	2.45	0.133	0.5
		$3s$	10355	550	0.657	1		0.593			0.067		0.000	3.43	0.153	0.4
		$4s$	10643	262	1.000	1		-0.084			0.004		0.000	4.29	0.171	0.0
		$1d$	10106	799	0.471	1	0.348				0.057		0.000	2.62	0.142	0.3
		$2d$	10416	489	0.760	1	-0.325				0.033		0.000	3.55	0.160	0.1
		$3d$	10689	216	1.000	1	0.066				0.003		0.000	4.38	0.177	0.0
		$4d$	10939													
$3(s/d)_1$	11103	$1s$	9551	1552	0.323	1		-0.175		-0.167	0.056	0.259	0.167	1.21	0.153	0.3
		$2s$	10017	1086	0.387	1		-0.023		0.277	0.005	0.300	0.277	2.45	0.173	0.0
		$3s$	10355	748	0.495	1		-0.405			0.062		0.000	3.43	0.194	0.3
		$4s$	10643	460	0.830	1		0.449			0.042		0.000	4.29	0.212	0.2
		$1d$	10106	997	0.407	1	0.702		1.789		0.143	1.784	1.789	2.62	0.183	1.9
		$2d$	10416	687	0.530	1	0.131				0.018		0.000	3.55	0.200	0.0
		$3d$	10689	414	0.989	1	-0.286				0.024		0.000	4.38	0.217	0.1
		$4d$	10939	164	1.000	1	0.042				0.001		0.000	5.14	0.233	0.0

```
Function als(x As Double) As Double
    ' Calculates the alphasB formula for given x, clamped between 0 and 1
    Dim val As Double

    ' Original formula
    val = 0.175082 - 0.000774928 / x ^ 6 + 0.0128554 / x ^ 5 - 0.0479785 / x ^ 4 + _
          0.111682 / x ^ 3 - 0.120244 / x ^ 2 + 0.278722 / x - 0.00282622 * x

    ' Clamp the result between 0 and 1
    If val < 0 Then
        als = 0.0001
    ElseIf val > 1 Then
        als = 1
    Else
        als = val
    End If
End Function



Function das(x As Double) As Double
    das = (als(x / 2) - als(2 * x)) / 2
End Function



Function VgC(x As Double) As Double
    sigma = 0.215
    kappa = 0.240
    Egc = -0.028-0.428
    mc = 1.47
    VgC = sigma * x - kappa / x + 2 * mc + Egc
End Function

Function VgB(x As Double) As Double
    sigma = 0.215
    kappa = 0.240
    Egc = -0.028-0.423
    mb = 4.88
    VgB = sigma * x - kappa / x + 2 * mb + Egc
End Function
```

1. Activa la pestanya Desenvolupador
Ves a **Fitxer → Opcions → Personalitza la cinta d’opcions**.
A la llista de la dreta, marca **Desenvolupador**.
Prem **D’acord** → ara et sortirà la pestanya **Desenvolupador** a la cinta de menús.

2. Obre l’editor de VBA
A la pestanya **Desenvolupador**, fes clic a **Visual Basic**.

3. Crear un mòdul nou
A l’editor de VBA, ves al menú **Inserir → Mòdul**.
→ Et sortirà un full en blanc on pots escriure codi.

4. Notes importants
Desa el fitxer ctrl+s

Ves a la pestanya **Fórmules**
A la part dreta hi ha el grup **Opcions de càlcul** → fes clic a **Calcula ara** (*Calculate Now*)
→ això és el mateix que F9.