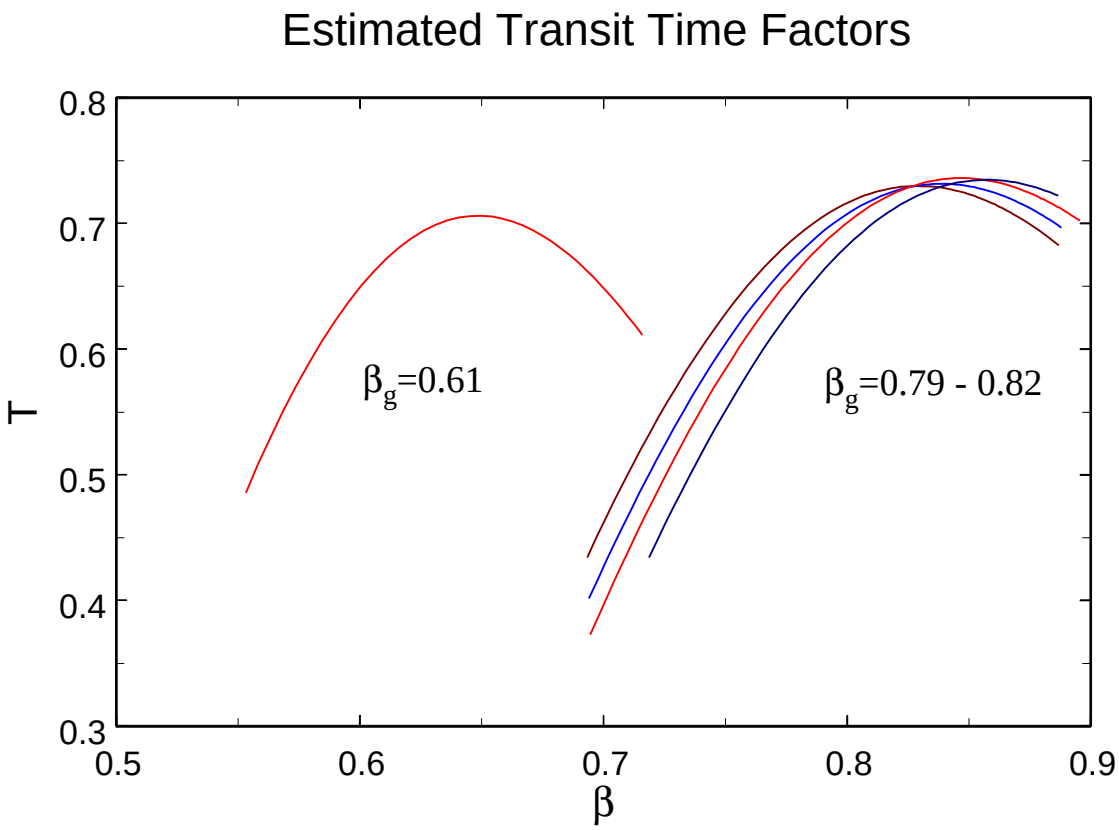
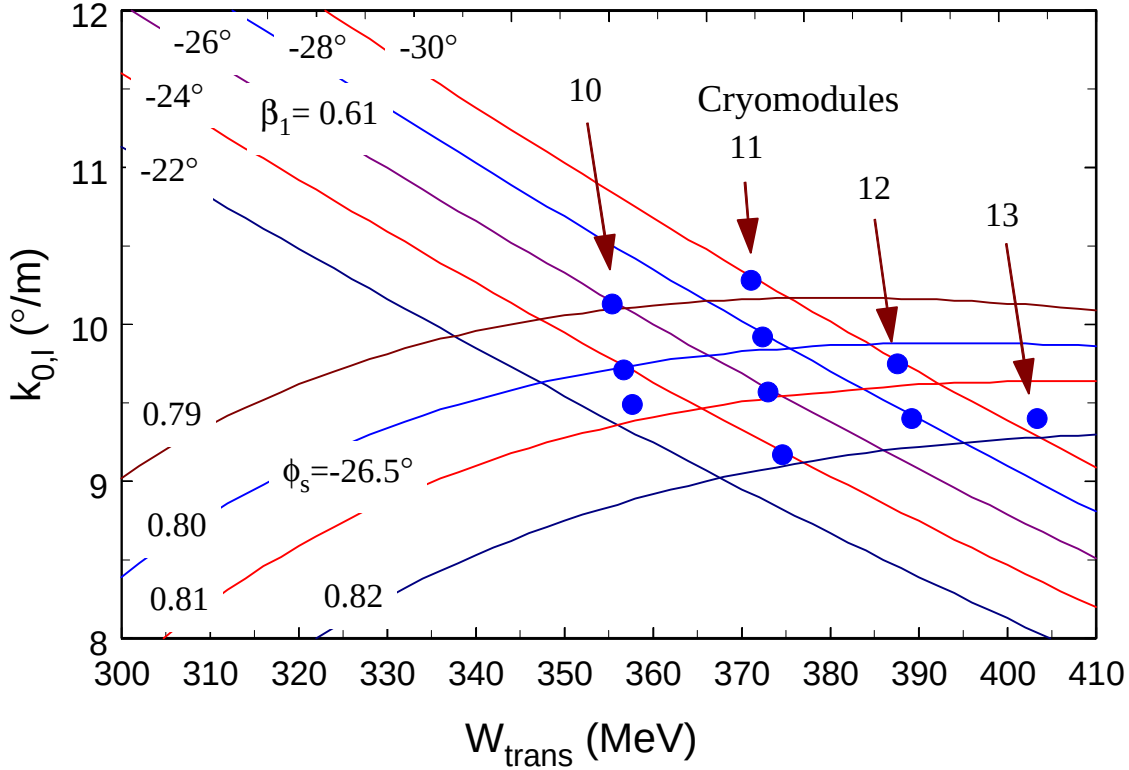
Trial Cavity Properties

Beta	Emax/E0	Tmax	Lperiod	k1 %	k2 %	Bmax/Emax
0.61	1.9004	0.70616	5.839	1.61	0.215	1.96
0.79	2.1502	0.72856	7.8340	1.58	0.193	2.15
0.8	1.5322	0.72968	7.8790	1.56	0.19	2.16
0.81	1.5256	0.7334	7.923	1.55	0.185	2.18
0.82	1.5129	0.73222	7.9680	1.58	0.19	2.18


Estimated Transit Time Factors
0.8
0.7
0.6
0.5
0.4
0.3
T
0.5
0.6
0.7
0.8
0.9
β
βg=0.61
βg=0.79 - 0.82

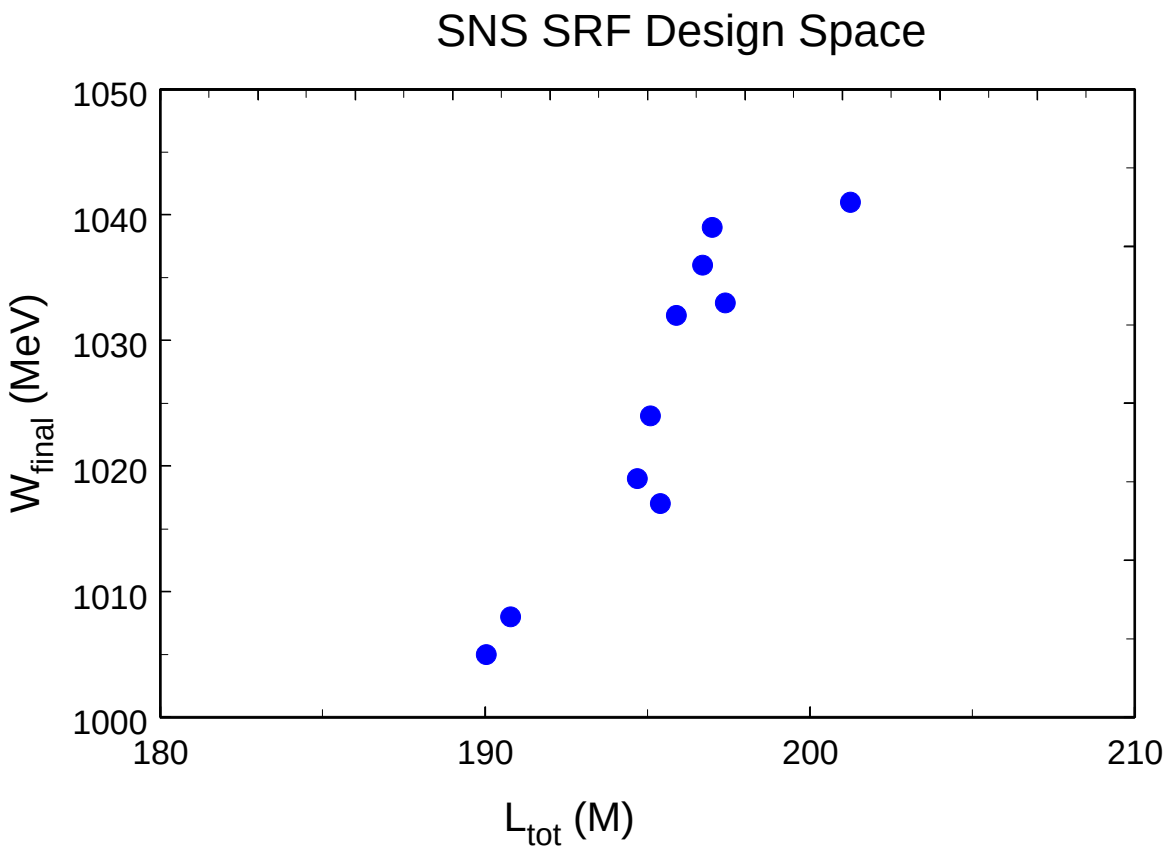
Longitudinal Phase Advance at Transition

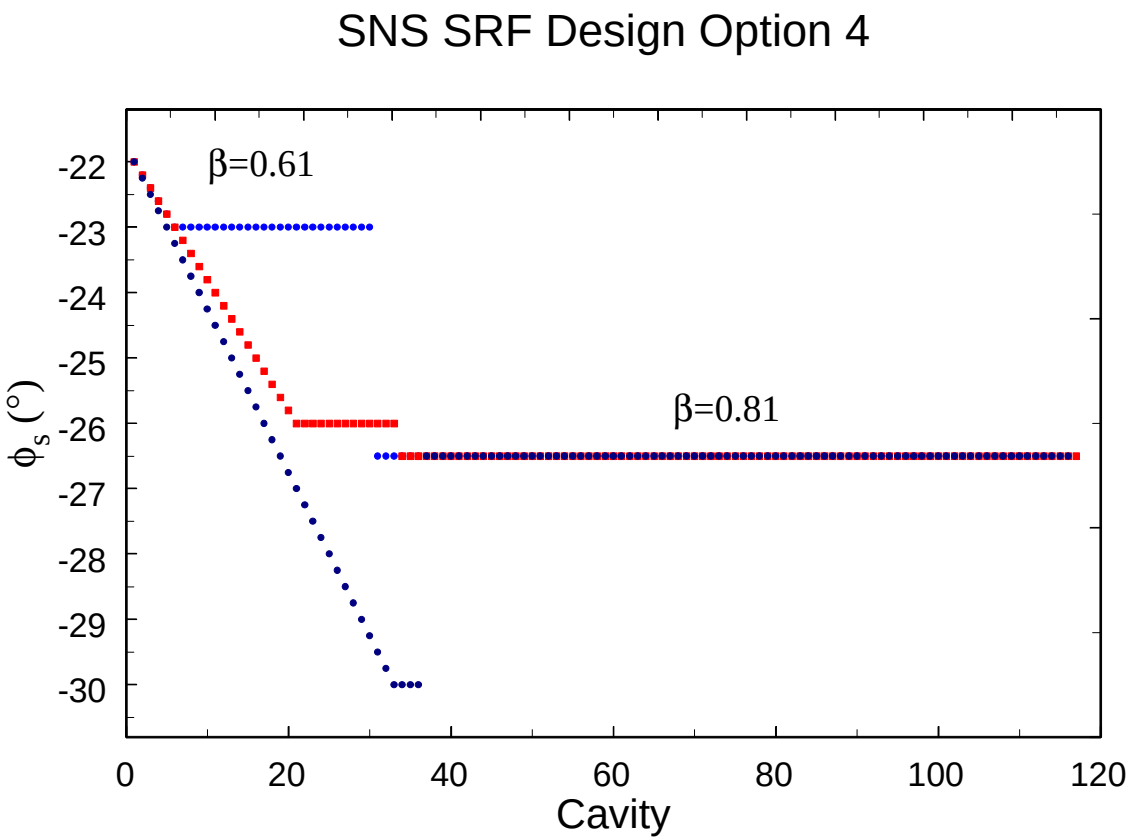
$$k_{0,l}^2 = \frac{\pi q \beta_G}{m_0 c^2} \frac{E_0 T \sin \phi_s}{\beta^3 \gamma^3}$$

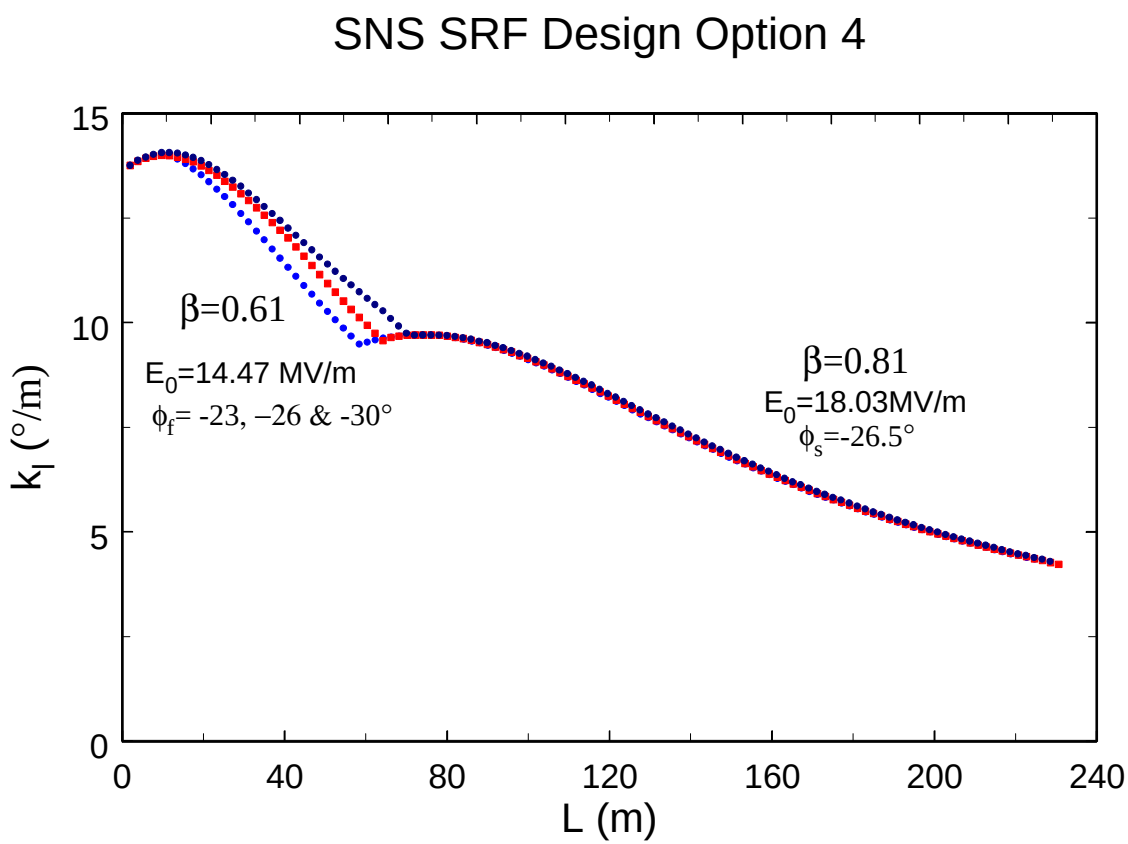


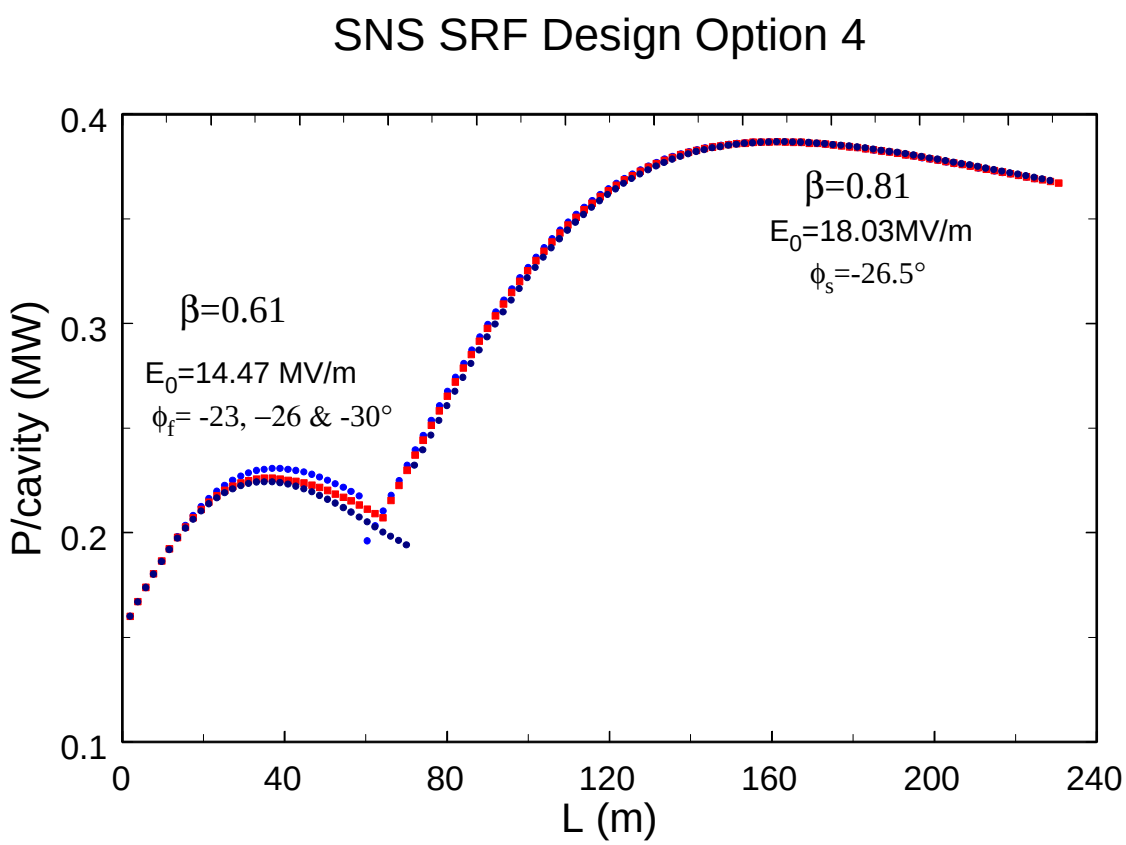
Linac Design Summary

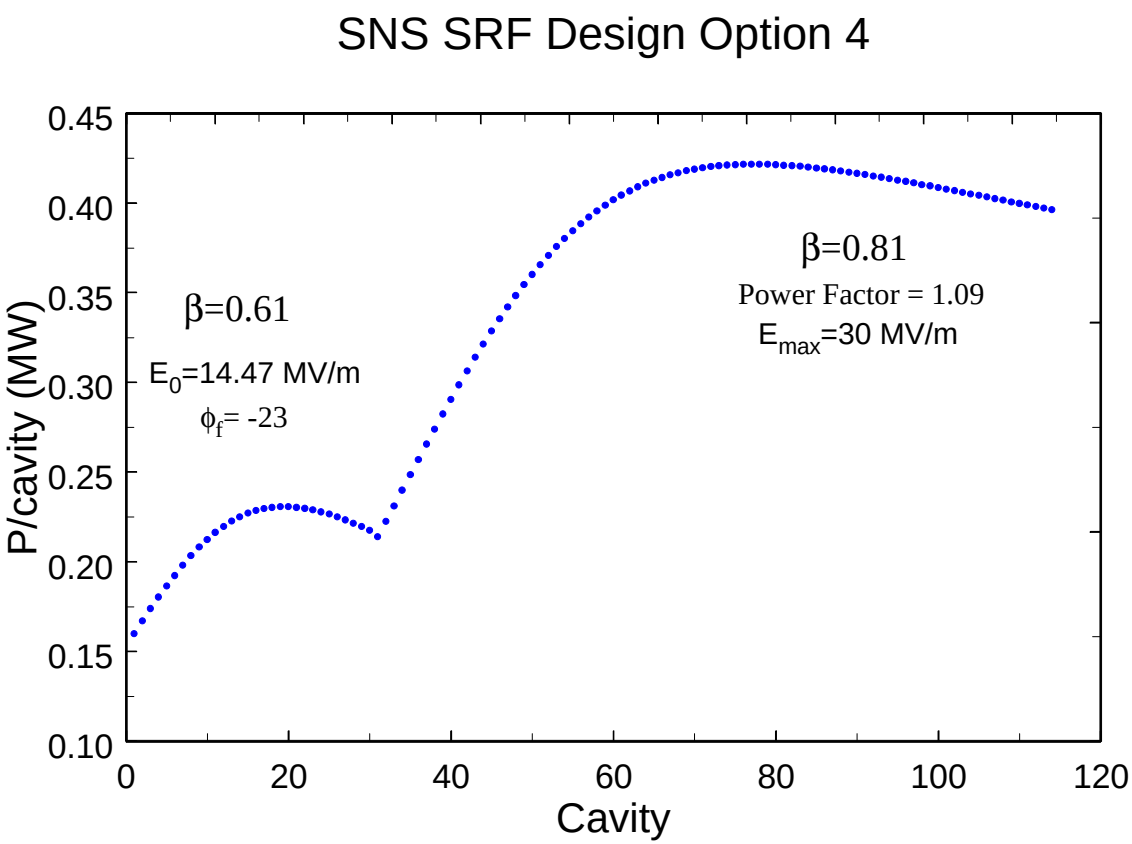
Beta2	Ncav1	Phi1	W1	K1	K2	Ncav2	Ncryo1	Ncryo2	Ncav Tot	Wf	Ncryo Tot	Ltot
0.81	30	-23	357.7	9.49	9.54	68	10	17	98	1008	27	190.80
0.8	30	-24	356.7	9.71	9.87	68	10	17	98	1005	27	190.05
0.79	30	-26	355.4	10.13	10.22	69	10	18	102	1039	28	197.00
0.82	33	-24	374.6	9.17	9.23	65	11	17	101	1033	28	197.40
0.81	33	-26	373	9.57	9.65	65	11	17	101	1036	28	196.70
0.8	33	-28	372.4	9.92	9.94	65	11	17	101	1032	28	195.90
0.79	33	-30	371.1	10.28	10.25	66	11	17	101	1024	28	195.10
0.82	36	-28	389.2	9.4	9.32	63	12	16	100	1017	28	195.40
0.81	36	-30	387.6	9.75	9.7	63	12	16	100	1019	28	194.70
0.82	39	-31	403.4	9.4	9.37	61	13	16	103	1041	29	201.25
0.81	30	-23	357.7	9.49	9.54	-30	10	21	114	1175	31	221.97
0.81	33	-26	373	9.57	9.65	-33	11	21	117	1202	32	227.81
0.81	36	-30	387.6	9.75	9.7	-36	12	20	116	1185	32	225.86


SNS SRF Design Space
1050
1040
1030
1020
1010
1000
180
190
200
210
W_{final} (MeV)
L_{tot} (M)


SNS SRF Design Option 4
β=0.61
β=0.81
-22
-23
-24
-25
-26
-27
-28
-29
-30
ϕ_s (°)
0
20
40
60
80
100
120
Cavity


SNS SRF Design Option 4
15
10
5
0
0
40
80
120
160
200
240
L (m)
k_l (°/m)
β=0.61
E_0=14.47 MV/m
ϕ_f= -23, –26 & -30°
β=0.81
E_0=18.03MV/m
ϕ_s=-26.5°


SNS SRF Design Option 4
P/cavity (MW)
L (m)
0.4
0.3
0.2
0.1
0
40
80
120
160
200
240
β=0.61
E0=14.47 MV/m
φf= -23, –26 & -30°
β=0.81
E0=18.03MV/m
φs=-26.5°


SNS SRF Design Option 4
P/cavity (MW)
Cavity
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0
20
40
60
80
100
120
β=0.61
E0=14.47 MV/m
φf= -23
β=0.81
Power Factor = 1.09
Emax=30 MV/m