Nuclear Data Sheet Production

NDS PROGRAM IN JAVA

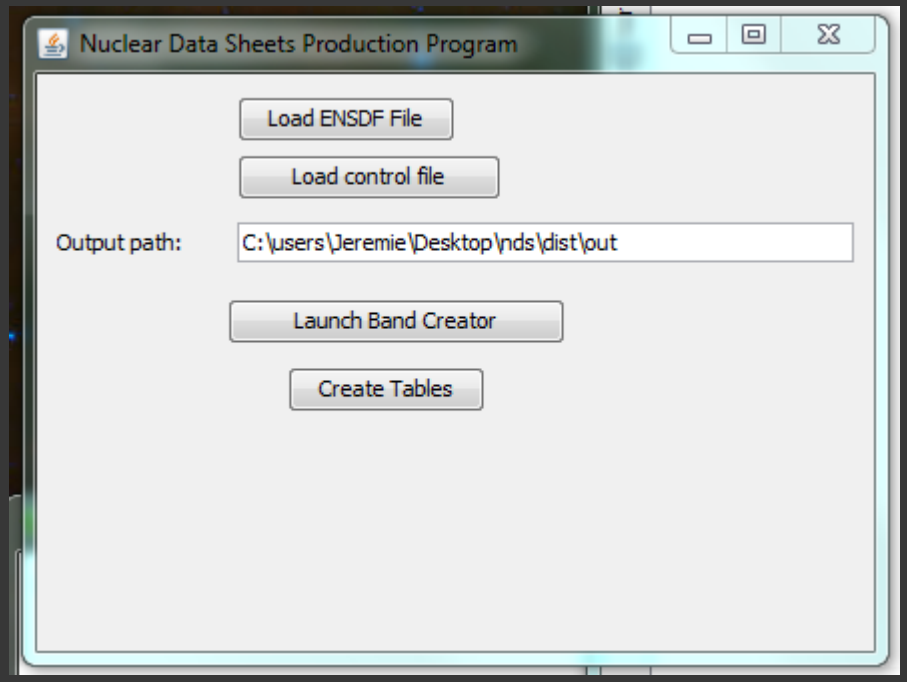
Contributions

- Presented by Jeremie Choquette (McMaster)
- Code written by Roy Zwina, Scott Geraedts, Jeremie Choquette (McMaster)
- Consultations with: Balraj Singh and Chris Ouellet (McMaster), Jagdish Tuli and Marion Blennau (NNDC) and Coral Baglin (LBNL)

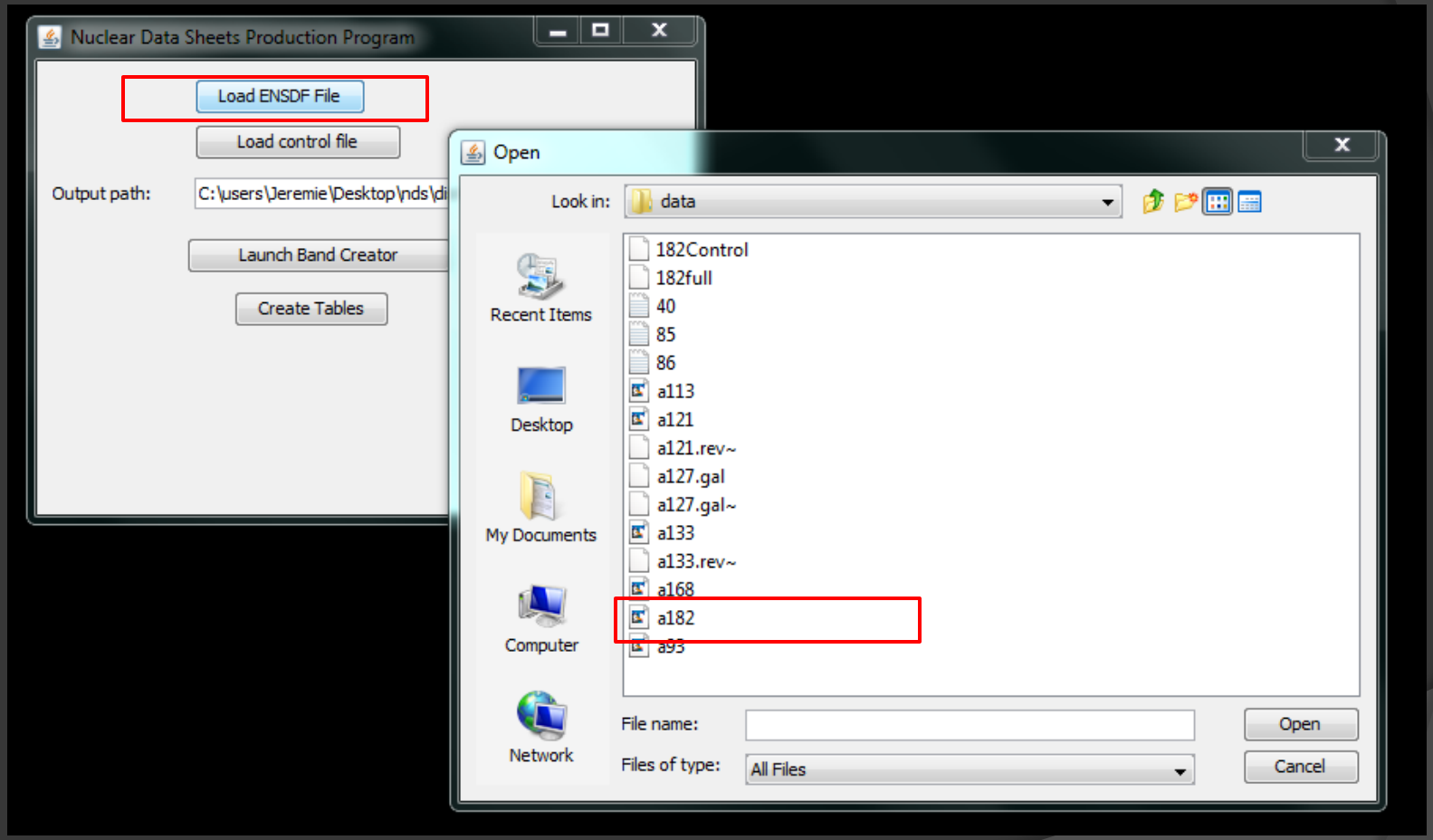
How it works

- The program loads a complete mass chain (or a dataset) and a control file
- The control file dictates layout and formatting, as well as which datasets, tables and drawings are to be included
- The program generates an output file in LaTeX (drawings in metapost)
- The LaTeX file is converted to PDF format

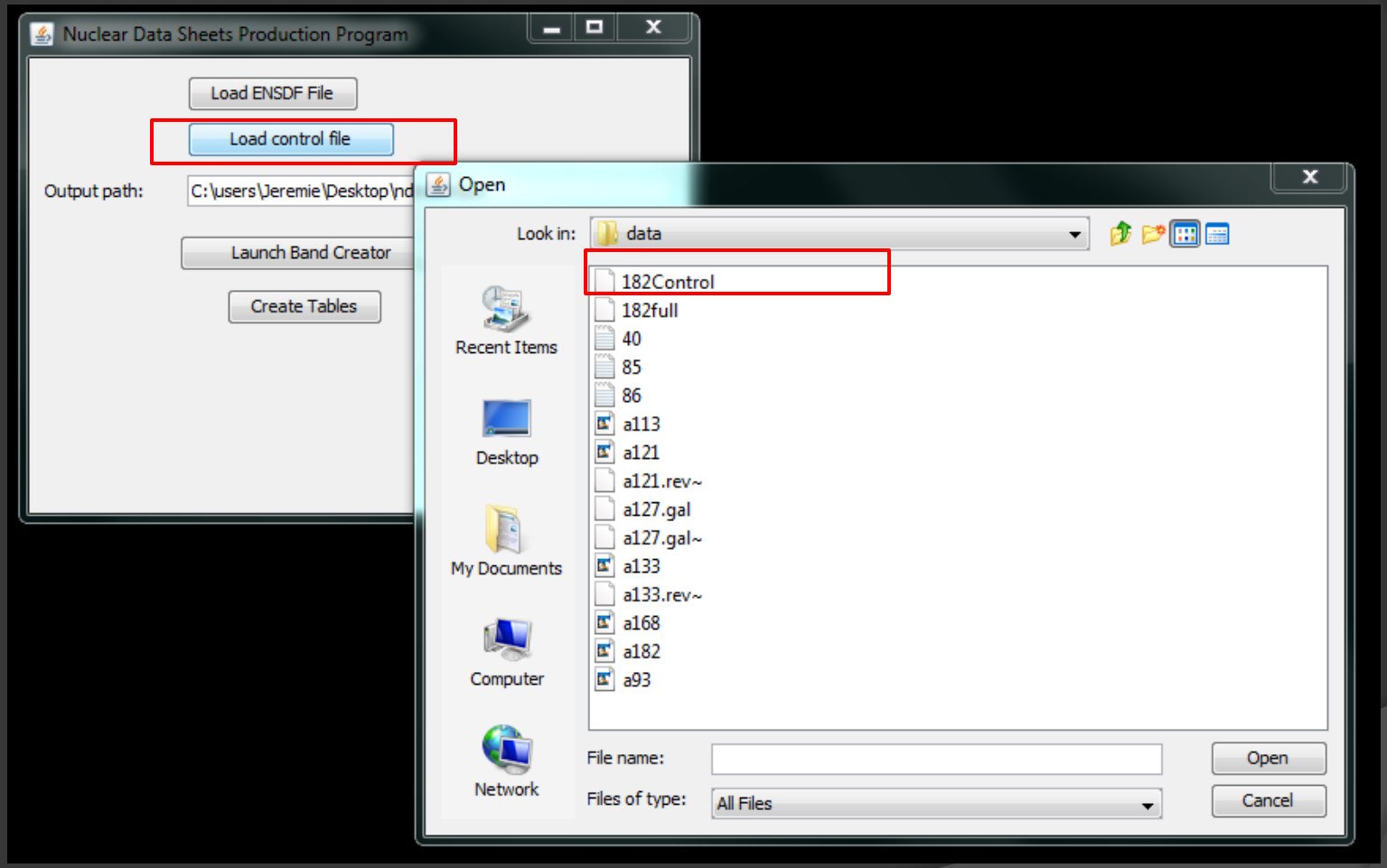
Running the Program



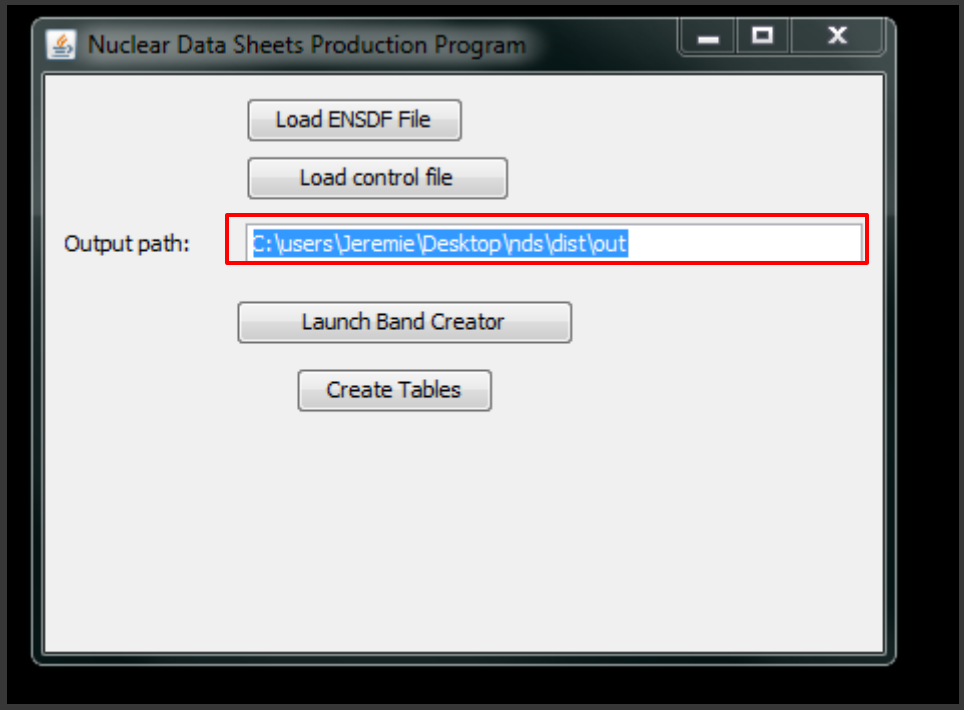
Running the Program



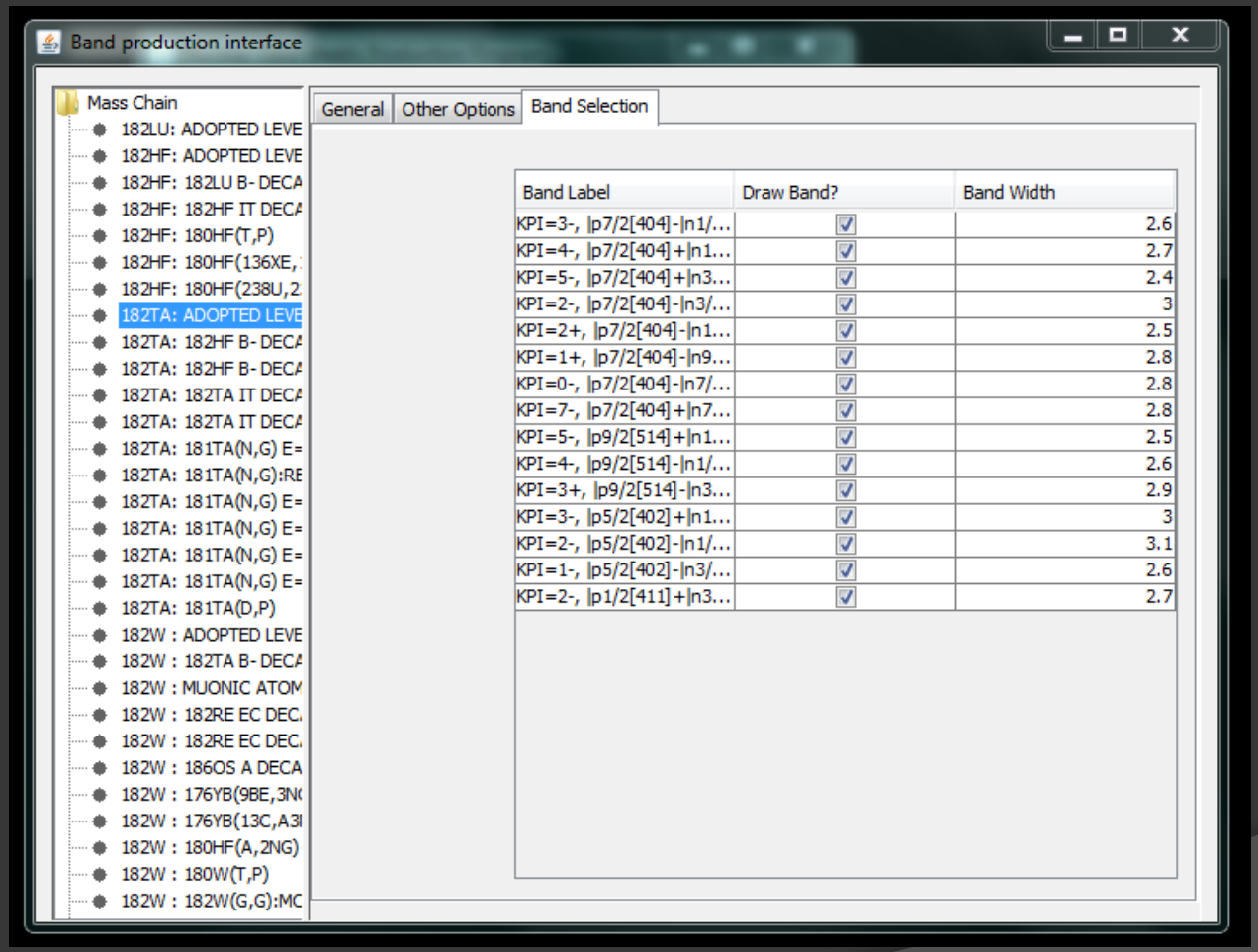
Running the Program



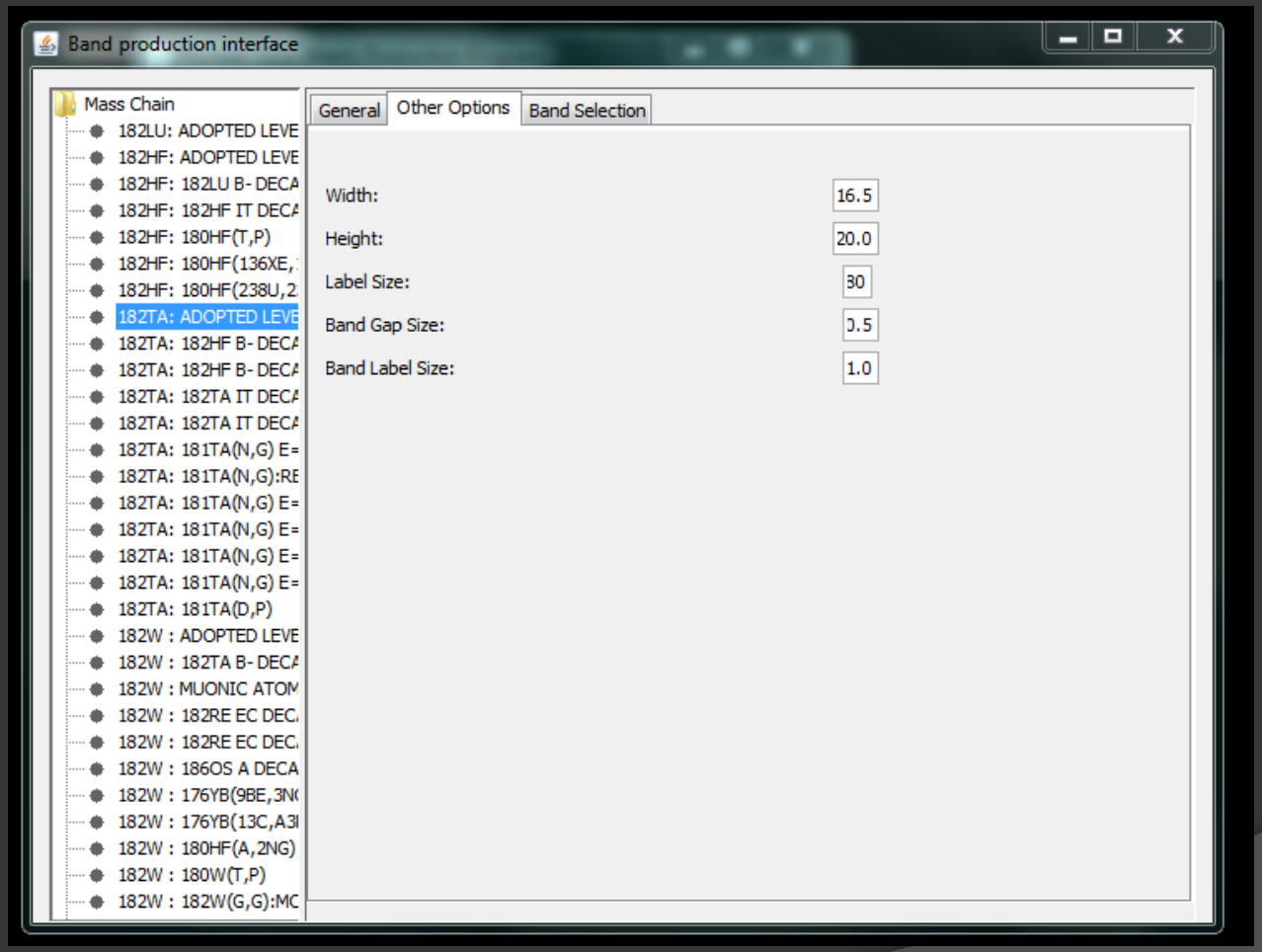
Running the Program



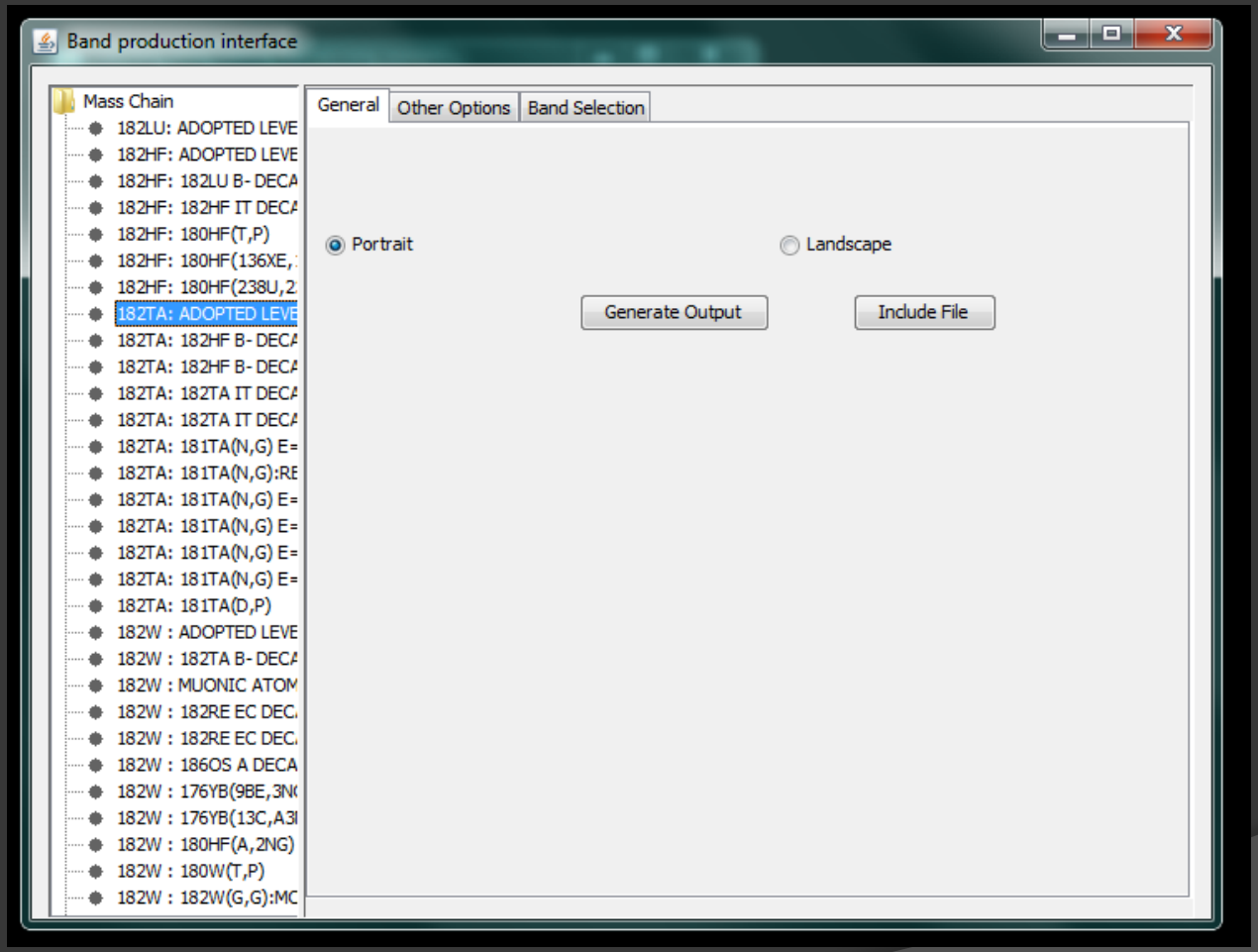
Running the Program



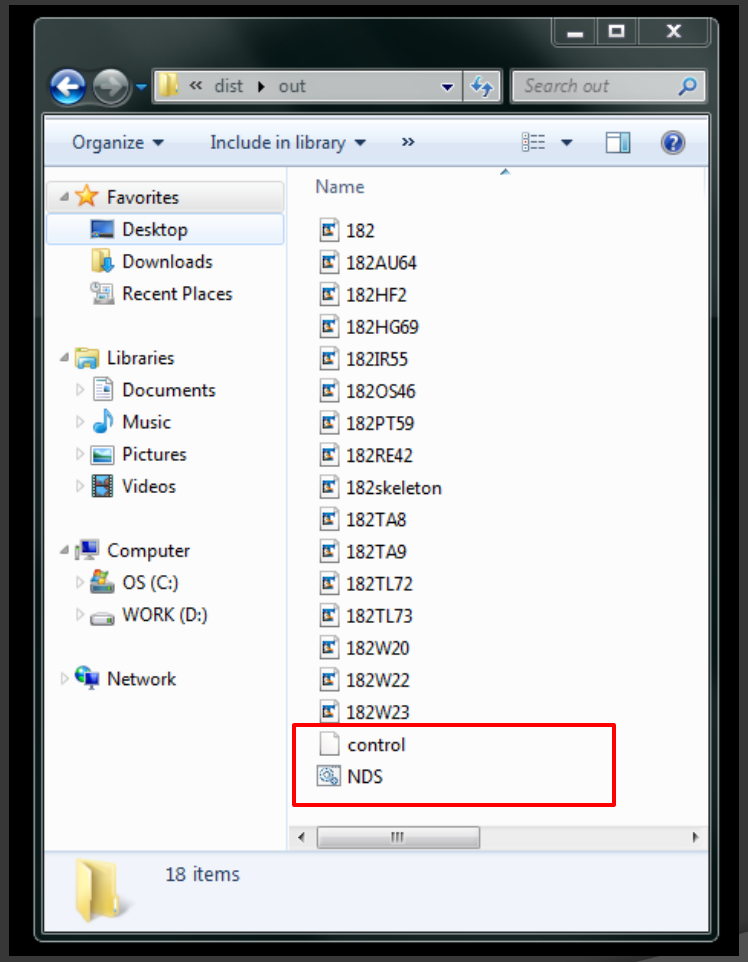
Running the Program



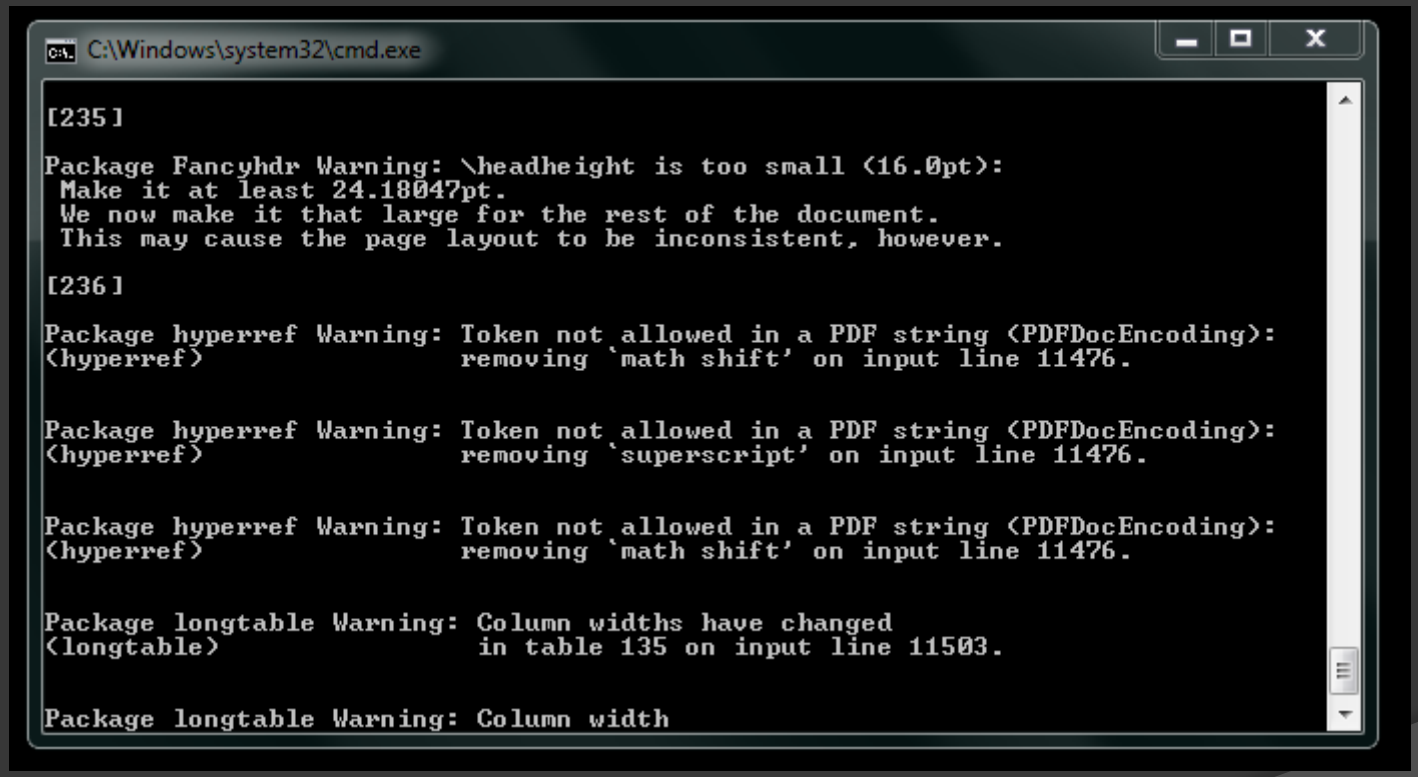
Running the Program



Running the Program



Running the Program



^{182}Lu β^- decay (2.0 min) 1982Ki04

Parent: ^{182}Lu: E=0.0; $T_{1/2}$=2.0 min *2*; Q=4180 *SY*; %β^-=100
Q(g.s.): 4180 *200* (syst,2003Au03).
^{182}Lu produced by bombardment of natural tungsten and tantalum targets with ^{136}Xe beam at 9 MeV/nucleon.

^{182}Hf Levels

E(level)	J^π†
0.0	0+
97.77 *20*	2+
321.8 *6*	(4+)
818.4 *4*	(1,2+)
905.9 *6*	

† From Adopted Levels.

$\gamma(^{182}Hf)$

E_γ	E_i^{level}	J_i^π	E_f^{level}	J_f^π	I_γ†	Mult.	α	Comments
97.8 *2*	97.77	2+	0.0	0+	50 *10*	E2	3.85 *7*	Mult.: from Adopted Gammas.
224.0 *5*	321.8	(4+)	97.77	2+	15 *7*	[E2]	0.198 *4*	
720.8 *5*	818.4	(1,2+)	97.77	2+	100 *10*			
808.1 *5*	905.9		97.77	2+	50 *15*			
818.2 *5*	818.4	(1,2+)	0.0	0+	100 *25*			

† For absolute intensity per 100 decays, multiply by 0.30 *3*

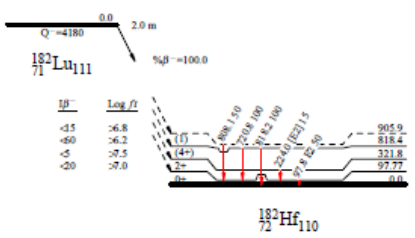
β^- radiations

Eβ⁻	E(level)	Iβ⁻†	Log *ft*
(3.3E+3)	905.9	<15	>6.8
(3.4E+3)	818.4	<60	>6.2
(3.9E+3)	321.8	<5	>7.5
(4.1E+3)	97.77	<20	>7.0

† Only the upper limits can be deduced since there is no knowledge of β feeding to g.s., and there is a large energy gap of ≈ 3.3 MeV between Q(β^-) and the highest level at 906 keV.

Decay Scheme

Intensities: Relative I_γ

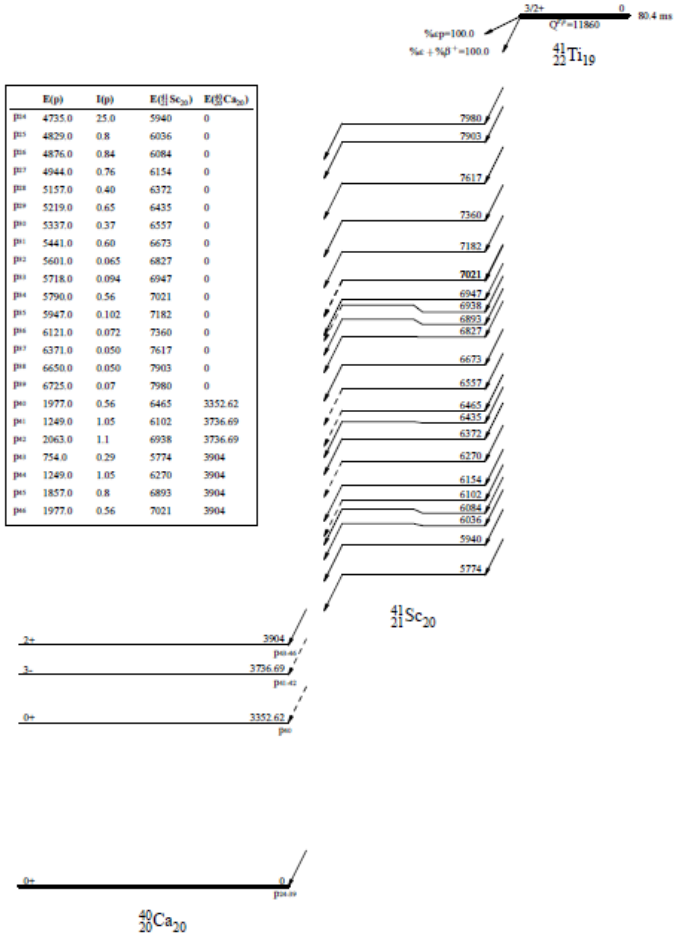


$\gamma(^{182}W)$ (continued)

E_i^{level}	J_i^π	E_f^{level}	J_f^π	E_γ†	I_γ†	Mult.‡	δ‡	α	$I_{(\gamma+ce)}$	Comments
		2273.87	9-	437.1 *1*	100 *18*	Q				
2730.85	(10-)	2455.74	(9-)	275.1 *1*	100 *14*	(D+Q)				
		2204.54	(8)-	526.2 *10*	<14					
2739.15	(10-)	2225.35	(8-)	513.8 *1*	100	Q				
2741.66	(11-)	2301.56	(9-)	440.1 *1*	100 *18*	Q				
		2273.87	9-	467.7 *5*	35 *6*					
2769.26	(10+)	2479.83	(9+)	289.4 *1*	100	D+Q				
		2212.49	(8+)	557.6 *5*	39 *4*					
2775.63	(12+)	2492.76	(11+)	282.8 *1*	100	D+Q				
		2230.63	(10+)	545.1 *2*	18 *3*	Q				
2823.93	(11-)	2563.94	(10-)	260.0 *1*	100	D+Q				
		2327.91	(9-)	496.0 *5*	48 *5*					
2884.1	1	100.10597	2+	2784 *1*	40 *11*					
		0.0	0+	2884 *1*	100					
2892.1	(1)	100.10597	2+	2792 *1*	150 *90*					
		0.0	0+	2892 *1*	100					
2941.0	(1,2+)	0.0	0+	2941 *2*	100					
2972.49	12-	2710.93	11-	261.6 *2*	20 *5*					
		2486.89	10-	485.6 *1*	100 *20*	Q				
2980.58	(11-)	2445.98	(9-)	534.6 *1*	100	Q				
2981.33	(12-)	2507.48	(10-)	473.8 *1*	100 *19*					
		2486.89	10-	494.6 *2*	38 *6*					
2996.1	1	100.10597	2+	2896 *1*	168 *35*					
		0.0	0+	2996 *1*	100					
3027.96	(11-)	2730.85	(10-)	297.1 *1*	100	(D+Q)				
		2455.74	(9-)	575.2 *20*	24 *11*					
3078.23	(13+)	2775.63	(12+)	302.5 *1*	100	D+Q				Iγ(586γ)/Iγ(302)=1.6 *7* in (α,2nγ).
		2492.76	(11+)	585.8 *2*	47 *9*	Q				
3080.1	1	100.10597	2+	2980 *1*	61 *18*					
		0.0	0+	3080 *1*	100					
3106.72	(12-)	2823.93	(11-)	282.8 *1*	100	(D+Q)				
		2563.94	(10-)	542.5 *5*	53 *6*					
3112.87	14+	2372.57	12+	740.3 *1*	100	(E2)		0.00843		B(E2)(W.u.)=1.7×10^2 *5*. α(K)=0.00678 *10*. α(L)=0.001277 *18*. α(M)=0.000297 *5*. α(N)+=8.28×10^{-5} *12*. α(N)=7.10×10^{-5} *10*. α(O)=1.114×10^{-5} *16*. α(P)=6.29×10^{-7} *9*.
3163.1	1	100.10597	2+	3063 *1*	54 *12*					
		0.0	0+	3163 *1*	100					
3198.1	(1,2+)	100.10597	2+	3098 *1*	59 *21*					
		0.0	0+	3198 *1*	100					
3224.53	13-	2710.93	11-	513.6 *1*	100	Q				
3269.56	(13-)	2741.66	(11-)	527.9 *1*	100	Q				
3319.7	(12-)	2739.15	(10-)	580.6 *4*	100					
3343.06	(12-)	3027.96	(11-)	315.1 *1*	100 *14*	(D+Q)				
		2730.85	(10-)	612.6 *10*	43 *29*					
3365.1	1	100.10597	2+	3265 *1*	63 *17*					
		0.0	0+	3365 *1*	100					
3398.33	(14+)	3078.23	(13+)	320.0 *1*	100	D+Q				
		2775.63	(12+)	622.7 *1*	61 *18*	Q				
3410.54	(13-)	3106.72	(12-)	303.8 *1*	100 *13*					
		2823.93	(11-)	586.8 *5*	88 *13*					
3415.90	(12)	2492.76	(11+)	923.1 *1*	100	D+Q				
3422.1	(1,2+)	100.10597	2+	3322 *1*	53 *15*					
		0.0	0+	3422 *1*	100					
3518.04	(14-)	2981.33	(12-)	536.7 *1*	100 *20*					
		2972.49	12-	545.7 *5*	40 *10*					
3549.99	14-	2981.33	(12-)	568.6 *10*	<22					
		2972.49	12-	577.5 *1*	100 *22*	Q				

Continued on next page (footnotes at end of table)

Decay Scheme (continued)



	E(p)	I(p)	E(f[Sc$_{20}$)	E(f[Ca$_{20}$)
p$_{14}$	4735.0	25.0	5940	0
p$_{15}$	4829.0	0.8	6036	0
p$_{16}$	4876.0	0.84	6084	0
p$_{17}$	4944.0	0.76	6154	0
p$_{18}$	5157.0	0.40	6372	0
p$_{19}$	5219.0	0.65	6435	0
p$_{20}$	5337.0	0.37	6557	0
p$_{21}$	5441.0	0.60	6673	0
p$_{22}$	5601.0	0.065	6827	0
p$_{23}$	5718.0	0.094	6947	0
p$_{24}$	5790.0	0.56	7021	0
p$_{25}$	5947.0	0.102	7182	0
p$_{26}$	6121.0	0.072	7360	0
p$_{27}$	6371.0	0.050	7617	0
p$_{28}$	6650.0	0.050	7903	0
p$_{29}$	6725.0	0.07	7980	0
p$_{0}$	1977.0	0.56	6465	3352.62
p$_{1}$	1249.0	1.05	6102	3736.69
p$_{2}$	2063.0	1.1	6938	3736.69
p$_{3}$	754.0	0.29	5774	3904
p$_{4}$	1249.0	1.05	6270	3904
p$_{5}$	1857.0	0.8	6893	3904
p$_{6}$	1977.0	0.56	7021	3904

Features

- The output can be generated with color diagrams for all datasets (including delayed particle decays)
- Can generate delayed particle decay drawings, with all three nuclides shown and table of data for particle emission
- Can switch between a shortened version for publishing and a full (or untruncated) version for online usage
- A short manual has been prepared which can be expanded when a final version is ready

Style

- The style approximates that of the current Nuclear Data Sheets; however, changes can be made to incorporate new ideas and suggestions
- Diagrams color-coded by relative intensity of decay

Maintenance and Changes

- Since the program is in Java, which is a popular programming language, the code offers reasonable flexibility and ease of access when making changes
- We feel that the long-term maintenance of this program should not be time-intensive
- The program is built to be clear and easy to edit

Future Plans

- Our goal is to have the program complete by mid summer 2011
- Few changes will be made until April 2011
- During May and June 2011, I plan to work closely with NNDC on the final version of the code
- By July 2011, this code will be handed over to NNDC, at which point McMaster group will phase out its involvement