Delay (efficiency) block

The code operates under MS Windows environment and provides a highly user-friendly interface.
It can be freely downloaded from the following internet addresses:
http://www.nscl.msu.edu/lise

version 8.3.147

To estimate FRIB rates :
Gas-cell, re-accelerator etc

http://groups.nscl.msu.edu/frib/rates/

Can be used as

- Gas-cell
- Re-accelerator
- Storage rings
- etc

To calculate the fraction of nuclei which survived decay,
To apply extraction efficiency and so on.

Reaccelerated beam rates

The reaccelerated beam rate is dependent on the charge breeding efficiency and the transport efficiency through the Q/A separator and the acceleration efficiency in the linac. These rate estimates are based on assumptions of performances that have not all been demonstrated. Further R&D will be required to achieve this performance.

The reaccelerated beam rates are calculated by the formula:

$$Reaccelerated\ beam\ rate = Stopped\_beam\_rate \times Survive_{breeding} \times Beps \times TraQA \times Reeps,$$

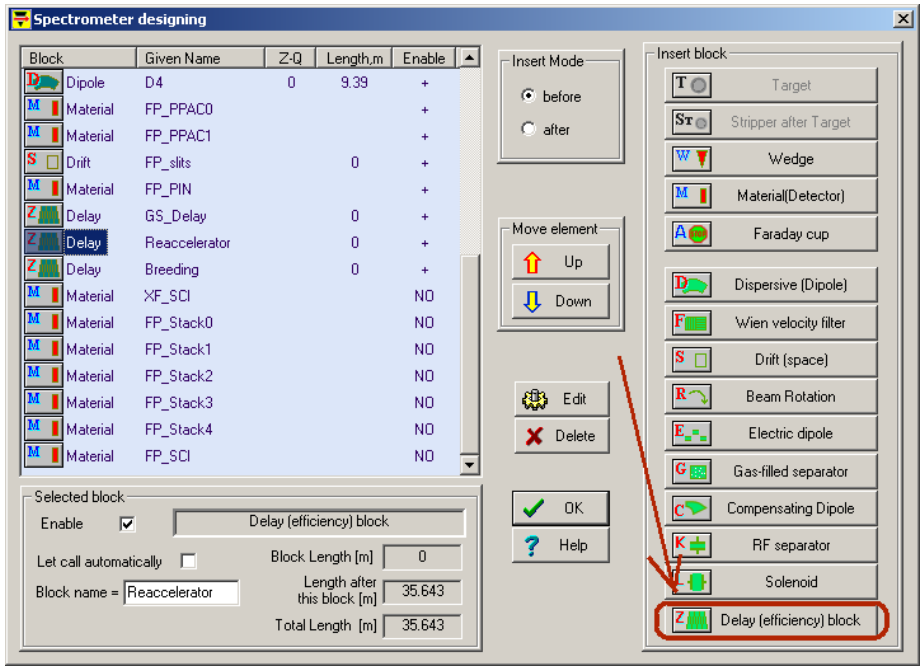
where *Reeps* is the Re-accelerator efficiency (80%), *TraQA* is the transport efficiency through the Q/A separator (95%), $Survive_{breeding}$ is part of nuclei which survived at breeding process, and *Beps* is the accumulation and breeding efficiency for single charge states. Different values were assumed for different mass regions, as shown in Table 4.

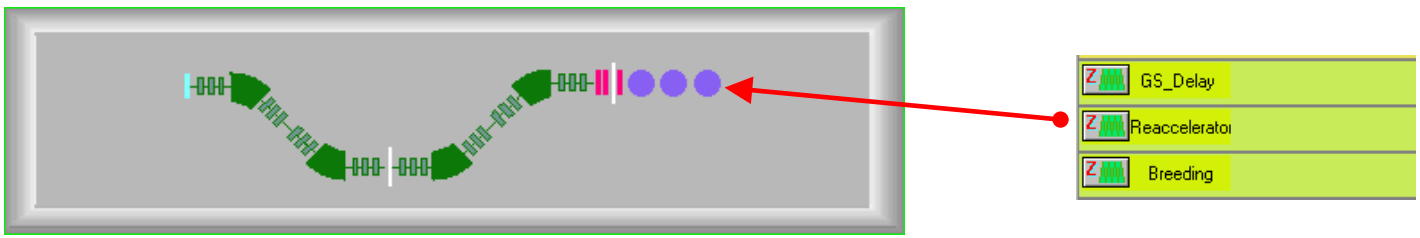
Table 4.

Mass region	Accumulation and breeding efficiency, *Beps*	Breeding time [ms]
M < 40	60%	10
40 ≤ M ≤ 150	50%	15
M > 150	40%	20

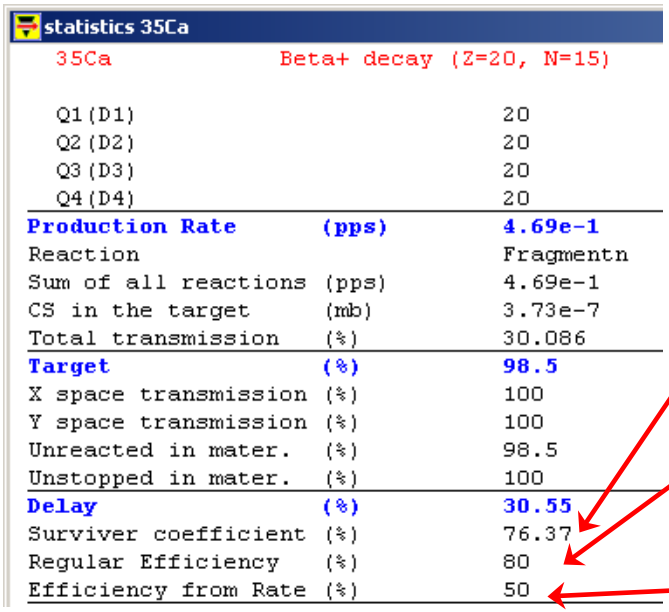
http://groups.nscl.msu.edu/frib/rates/FRIB_rates_readme.pdf

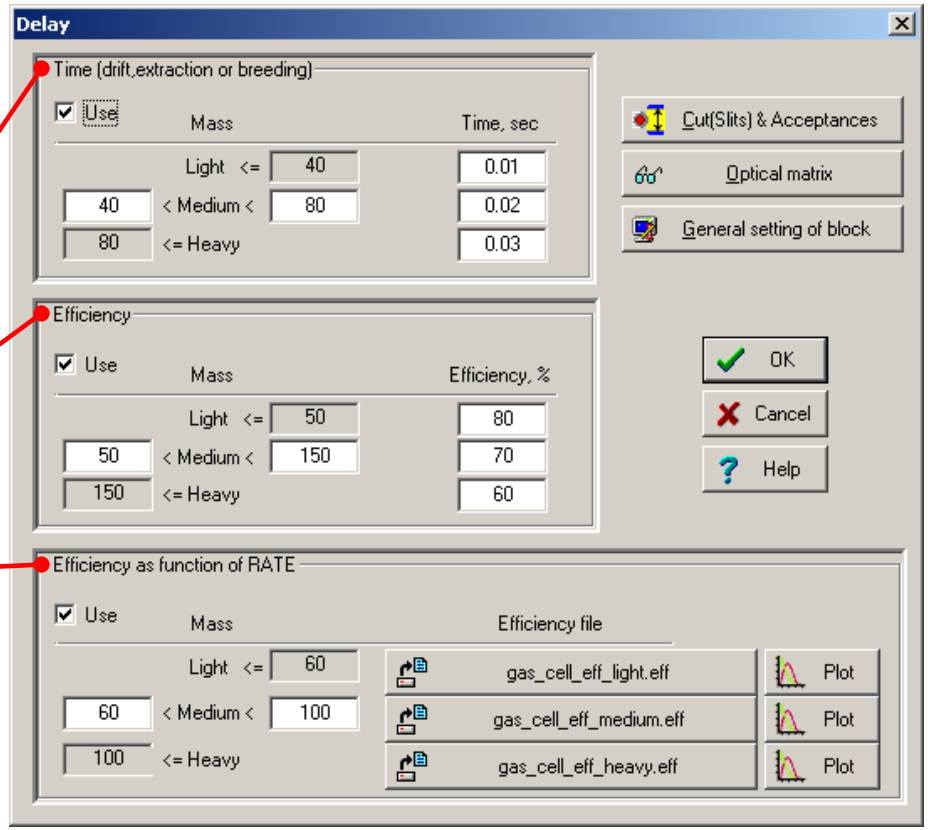
Set-up


Spectrometer designing
Block
Given Name
Z-Q
Length,m
Enable
Dipole D4 0 9.39 +
Material FP_PPAC0 +
Material FP_PPAC1 +
Drift FP_slits 0 +
Material FP_PIN +
Delay GS_Delay 0 +
Delay Reaccelerator 0 +
Delay Breeding 0 +
Material XF_SCI NO
Material FP_Stack0 NO
Material FP_Stack1 NO
Material FP_Stack2 NO
Material FP_Stack3 NO
Material FP_Stack4 NO
Material FP_SCI NO
Insert Mode
before
after
Move element
Up
Down
Edit
Delete
OK
Help
Insert block
Target
Stripper after Target
Wedge
Material(Detector)
Faraday cup
Dispersive (Dipole)
Wien velocity filter
Drift (space)
Beam Rotation
Electric dipole
Gas-filled separator
Compensating Dipole
RF separator
Solenoid
Delay (efficiency) block
Selected block
Enable
Delay (efficiency) block
Let call automatically
Block name = Reaccelerator
Block Length [m] 0
Length after this block [m] 35.643
Total Length [m] 35.643


GS_Delay
Reaccelerator
Breeding

The “Delay block” dialog

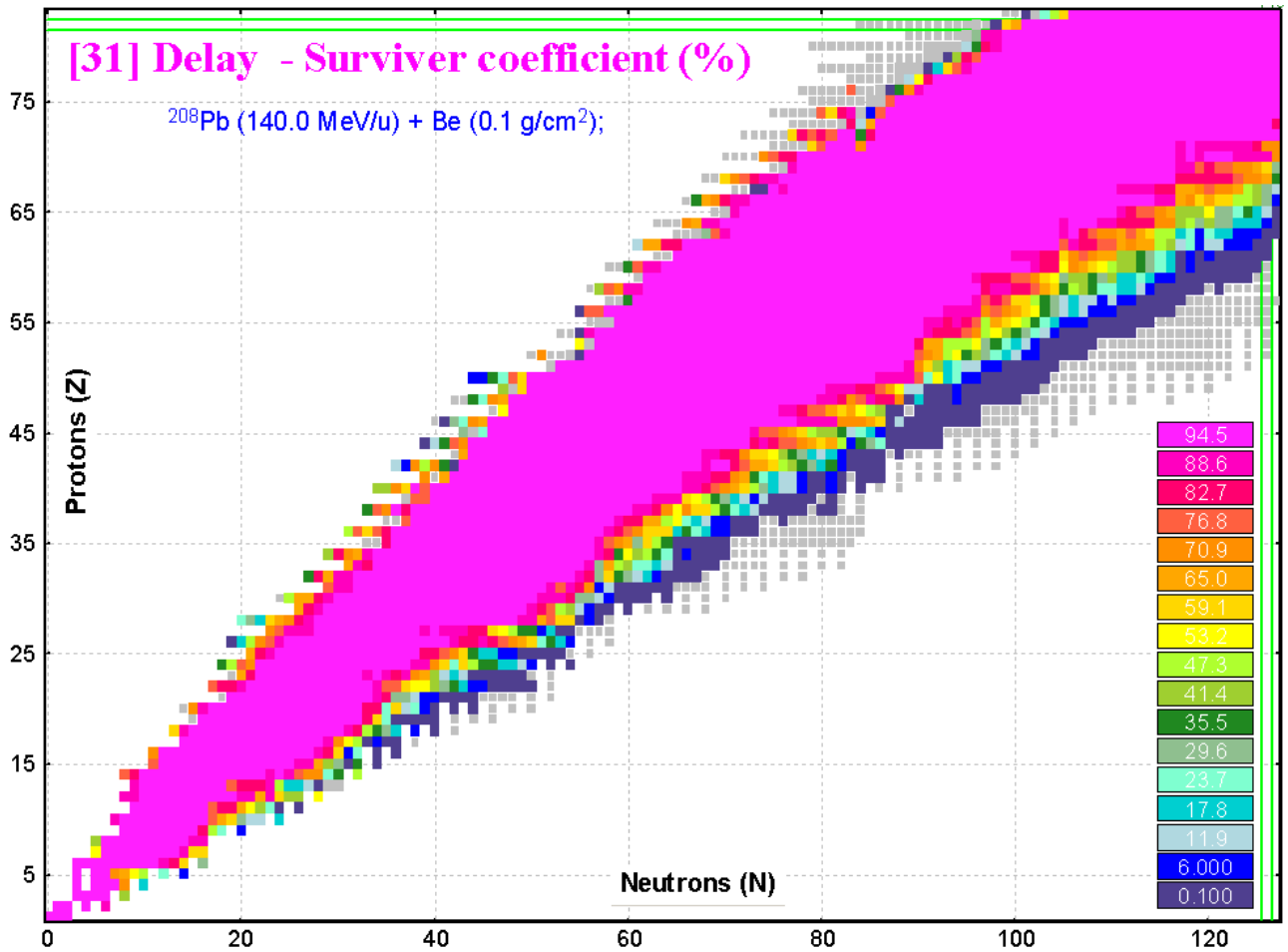




Time box : surviver coefficient

Time (drift,extraction or breeding)

Use	Mass		Time, sec
	Light <=	80	0.03
80	< Medium <	250	0.05
250	<= Heavy		0.07

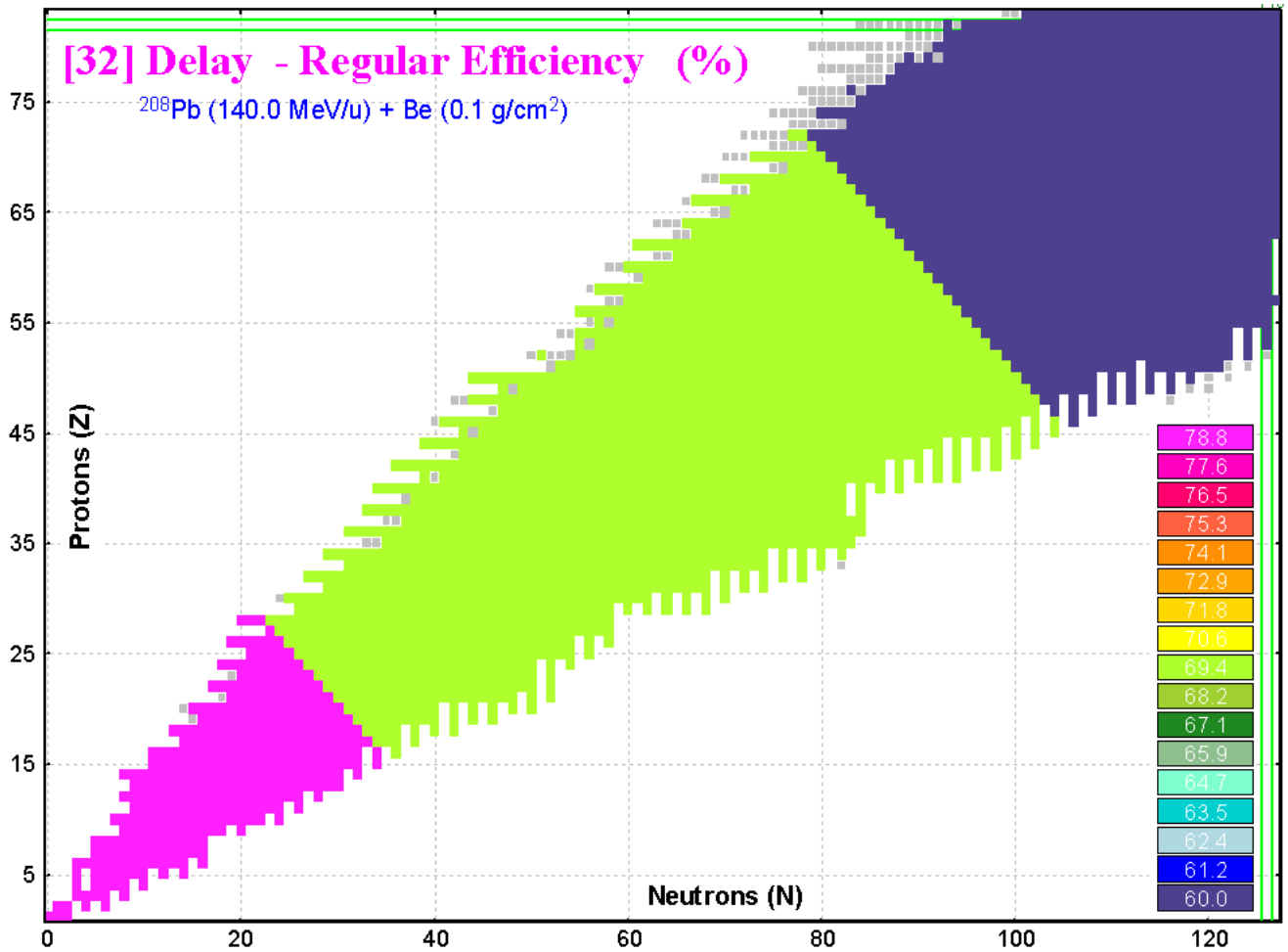


Efficiency box : regular efficiency

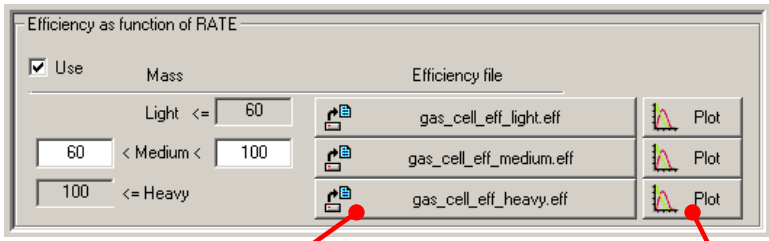
Efficiency

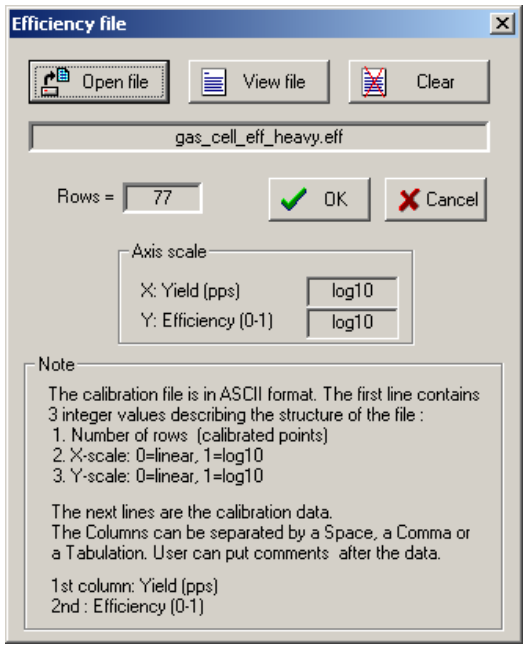
Use

Mass			Efficiency, %
	Light <=	50	80
50	< Medium <	150	70
150	<= Heavy		60

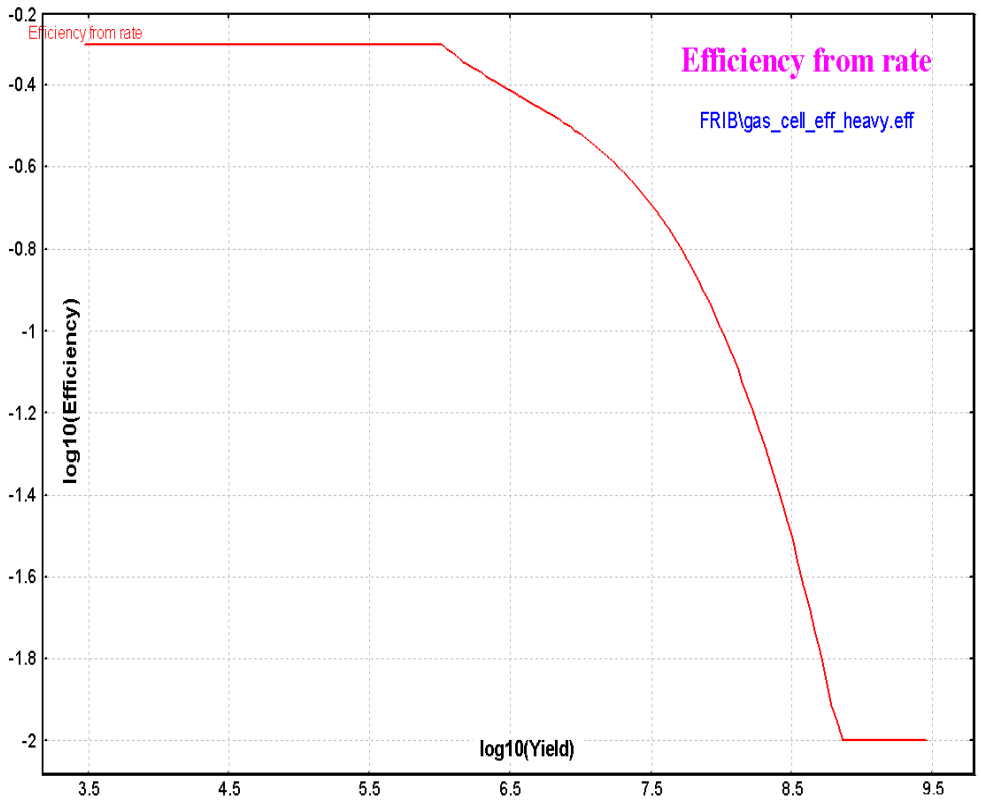


Efficiency from rate

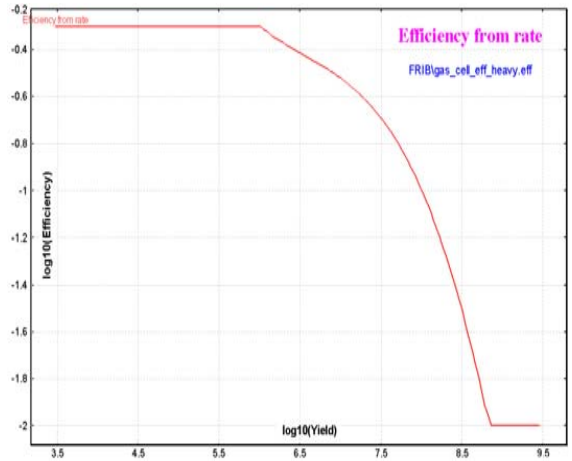


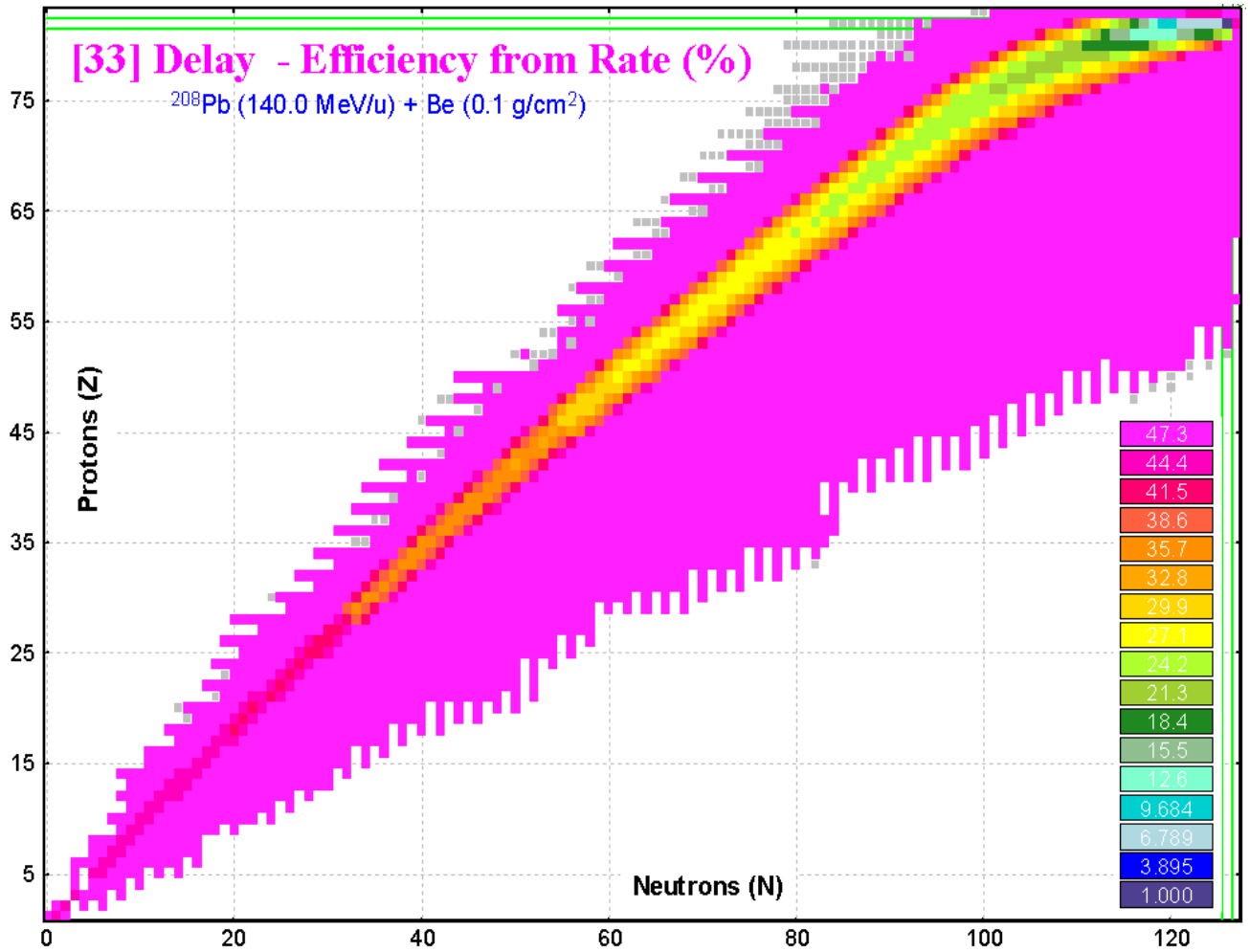


Default directory **"LISE\calibrations"**



Efficiency from rate





Acknowledgement

Thanks to
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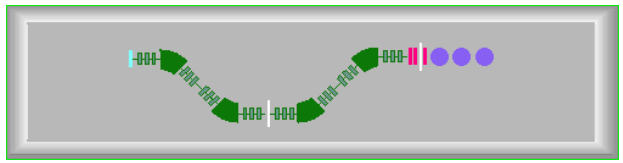
(NSCL/MSU)
for fruitful discussions

http://groups.nscl.msu.edu/lise/8_3/Delay/

Index of /lise/8_3/Delay

Name	Last modified	Size	Description
Parent Directory		-	
delay_example.lpp	16-Jul-2009 12:13	265K	
gas_cell_eff_heavy.eff	14-Jul-2009 16:42	1.9K	
gas_cell_eff_light.eff	14-Jul-2009 16:41	1.9K	
gas_cell_eff_medium.eff	14-Jul-2009 16:43	1.9K	



Copy *.eff files in the
directory **“LISE\calibrations\FRIB”**