



2.0 vs 1.4 GeV for ISOLDE GUI Meeting

J.P. Ramos



ISOLDE Upgrade to 2.0 GeV

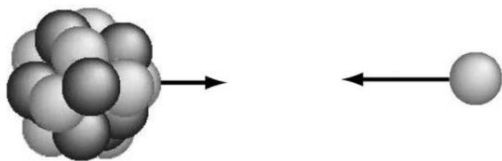
- ~40% higher energy
- 2microA to 6microA – factor of 3
 - Verify if all targets can cope with power
- Need upgrade of BTY line to ISOLDE
- Need upgrade of ISOLDE beam dumps
- ~10MCHF?

Simulation campaign

- Yield prediction for users
- Simulation campaign started 2 years ago in ABRABLA
- Simulations will be used for new database – to build a robust yield analysis / prediction tool

Simulation details

ABRABLA



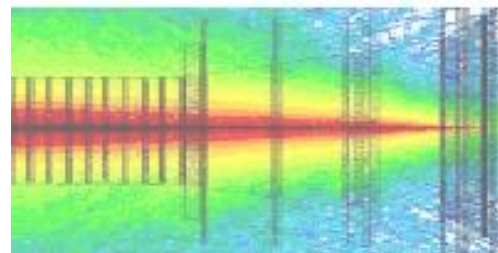
1 Gevents

8 cores (CERN Personal PCs)

max 1 week per simulation

Well benchmarked for spallation at
ISOLDE

FLUKA



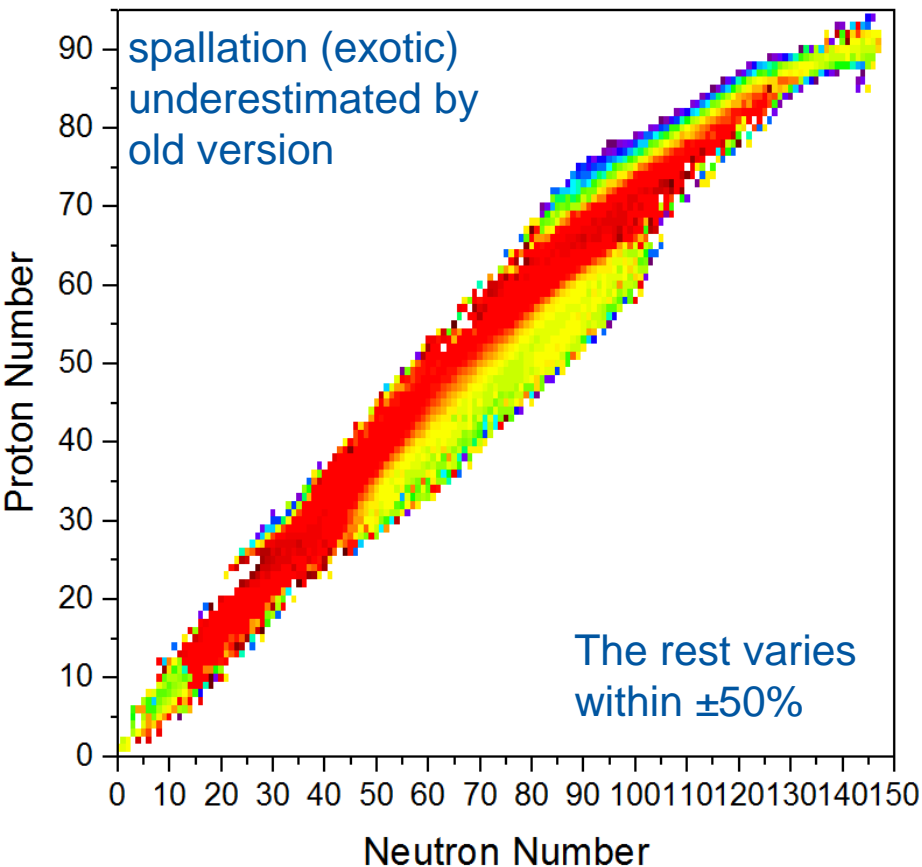
300 Mevents

40 cores (cluster)

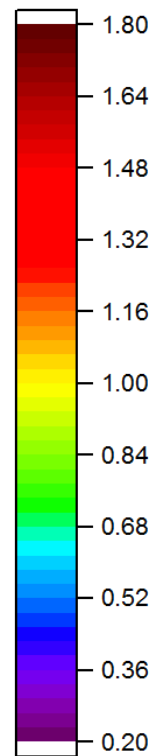
max 4 days per simulation

Normally underestimates spallation
products, good for other reactions

FLUKA Versions comparison



Public/develop



Problem in the clueet (CERN FLUKA Cluster):

- Cluster had to be reverted from the development version to the public

Simulation launched to benchmark

Dev v: FLUKA2017 v1.0

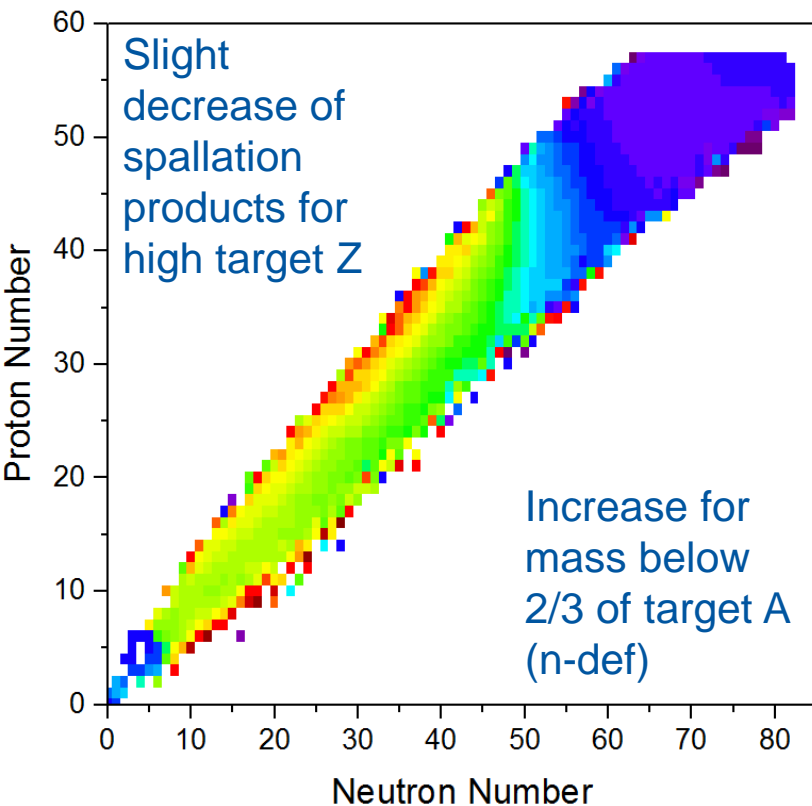
Public v: FLUKA2011 v2x.1



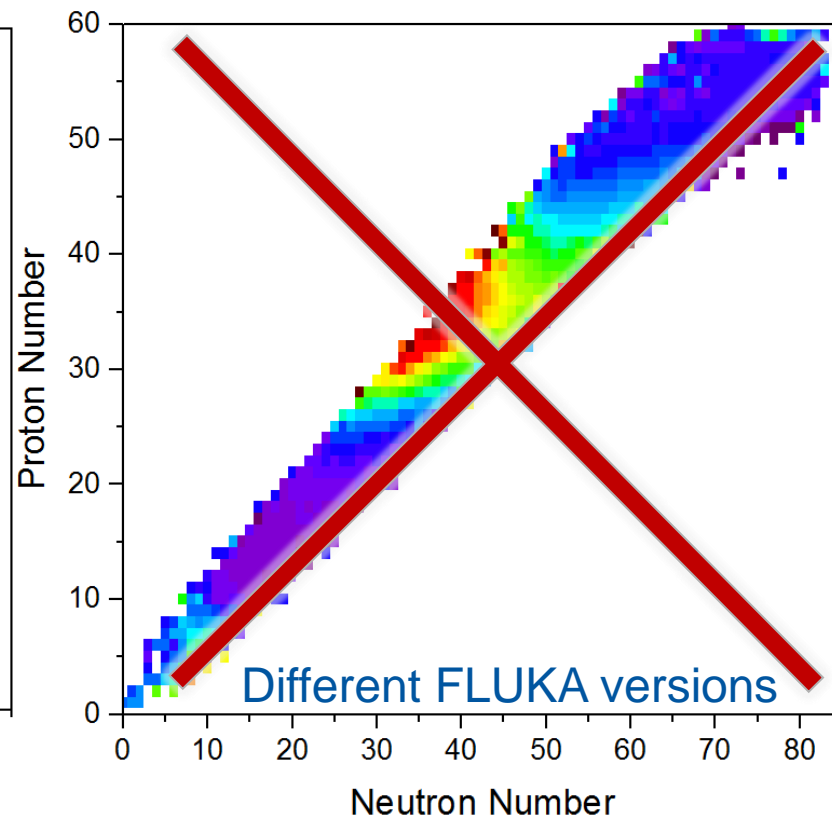
FLUKA Benchmark

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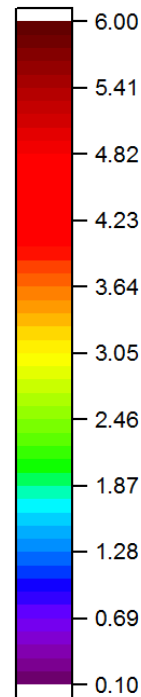
LaC2 target - ABRABLA



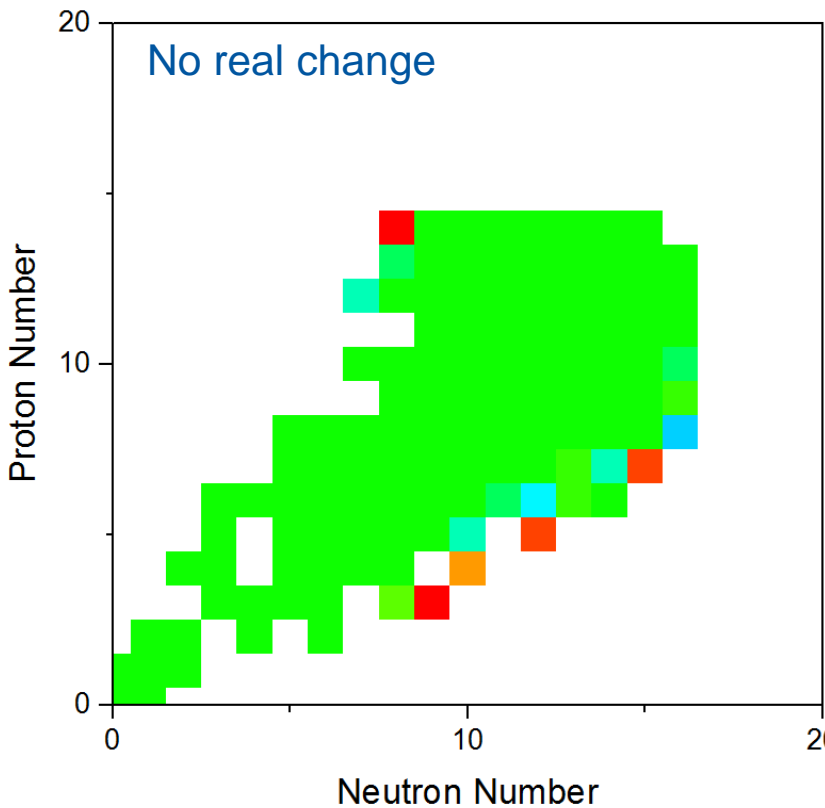
LaC2 target - FLUKA



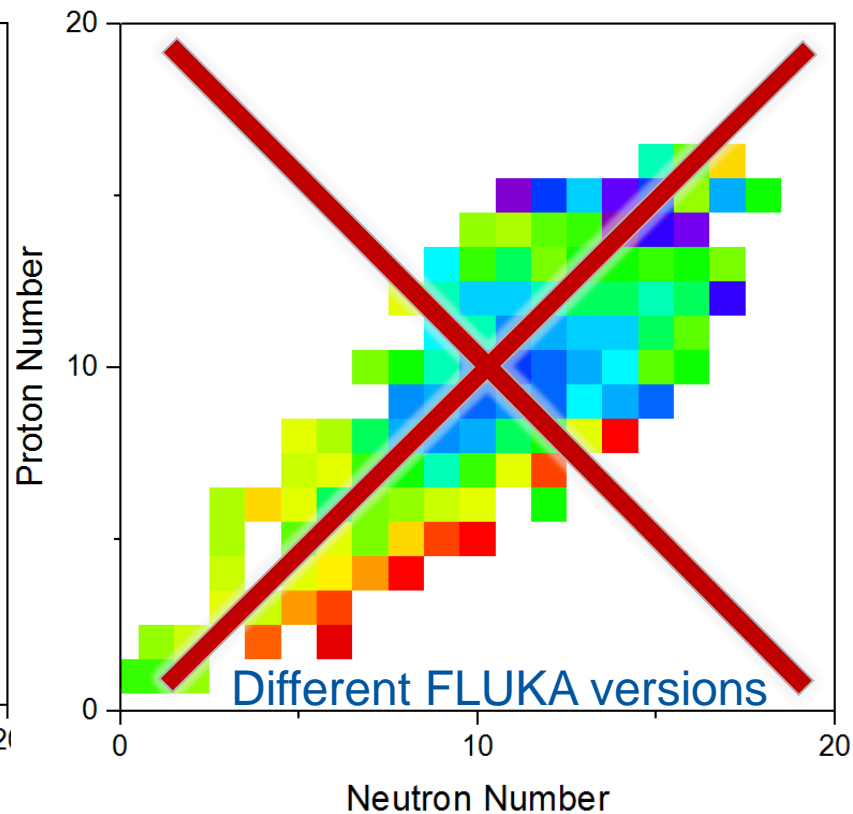
2.0 GeV/1.4GeV



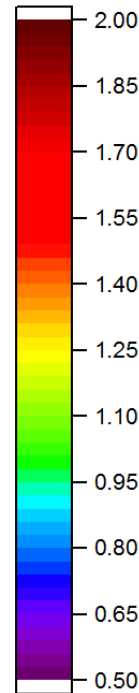
SiC target - ABRABLA

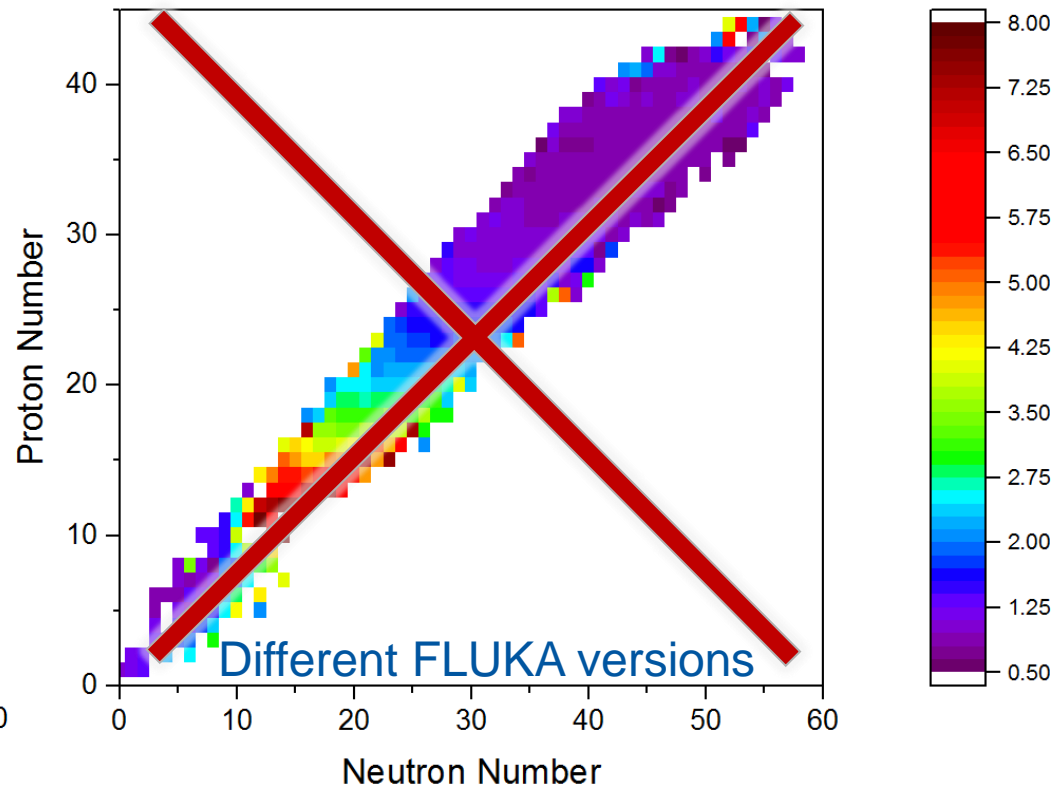
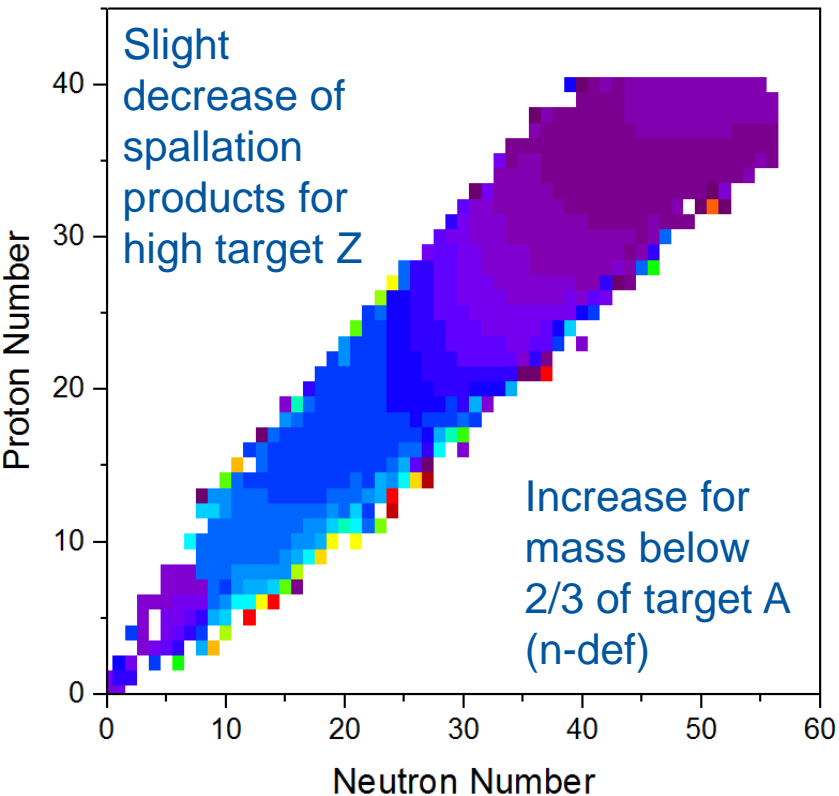


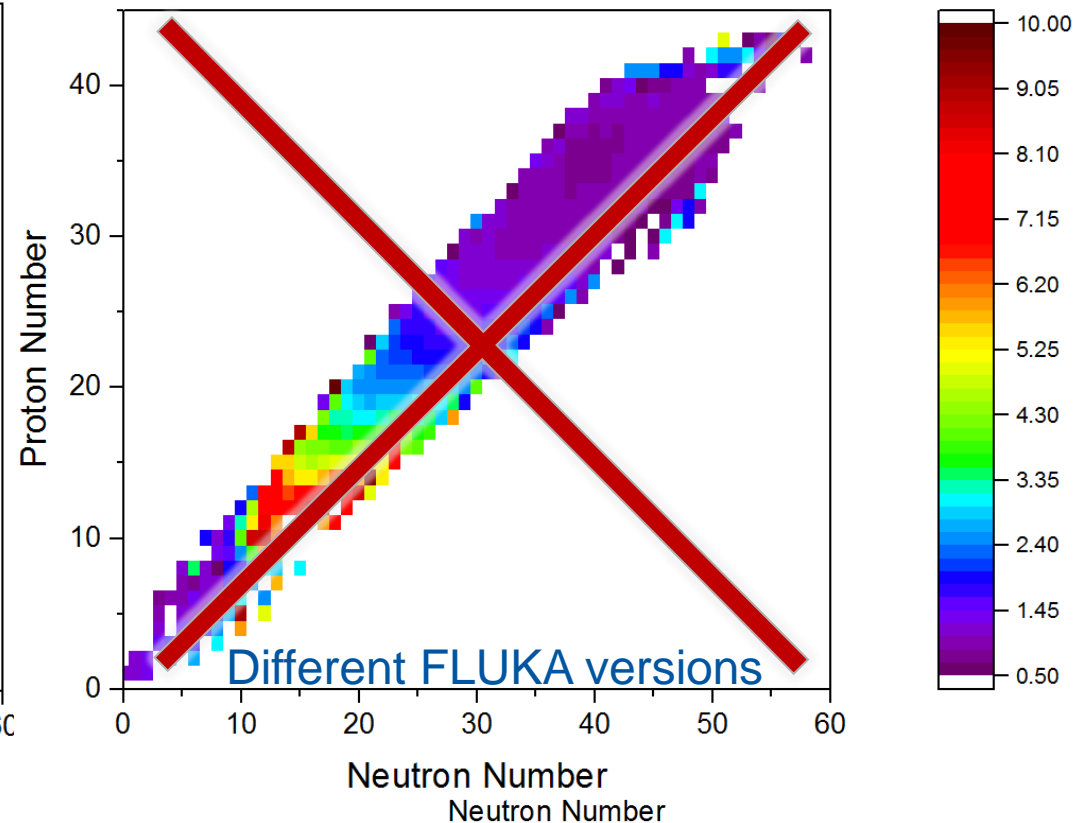
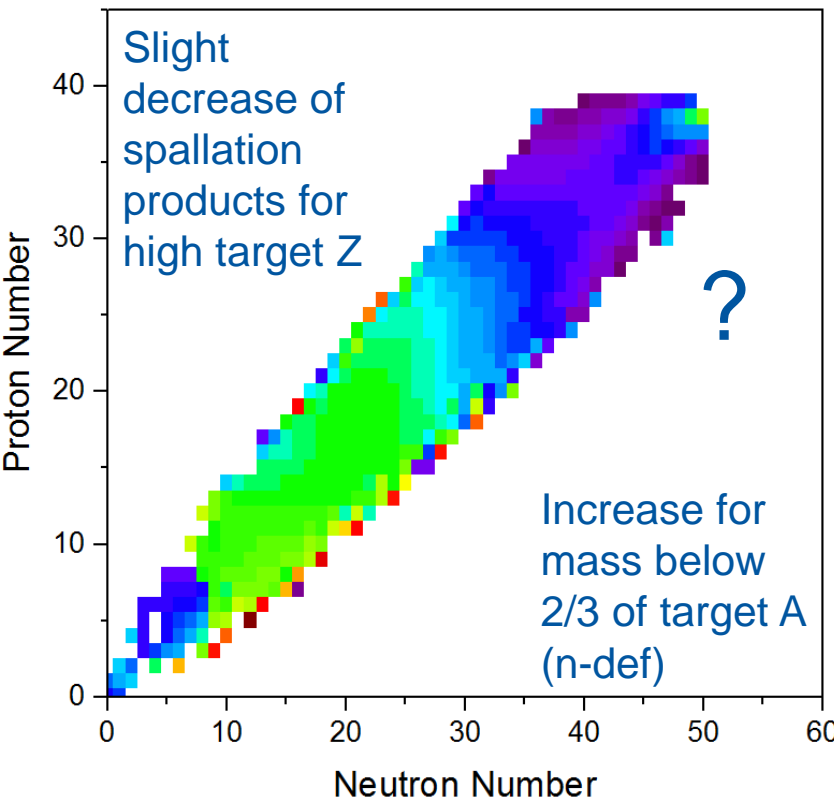
SiC target - FLUKA



2.0 GeV/1.4GeV



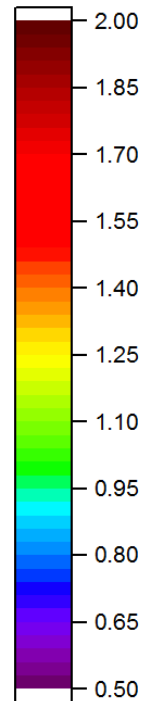
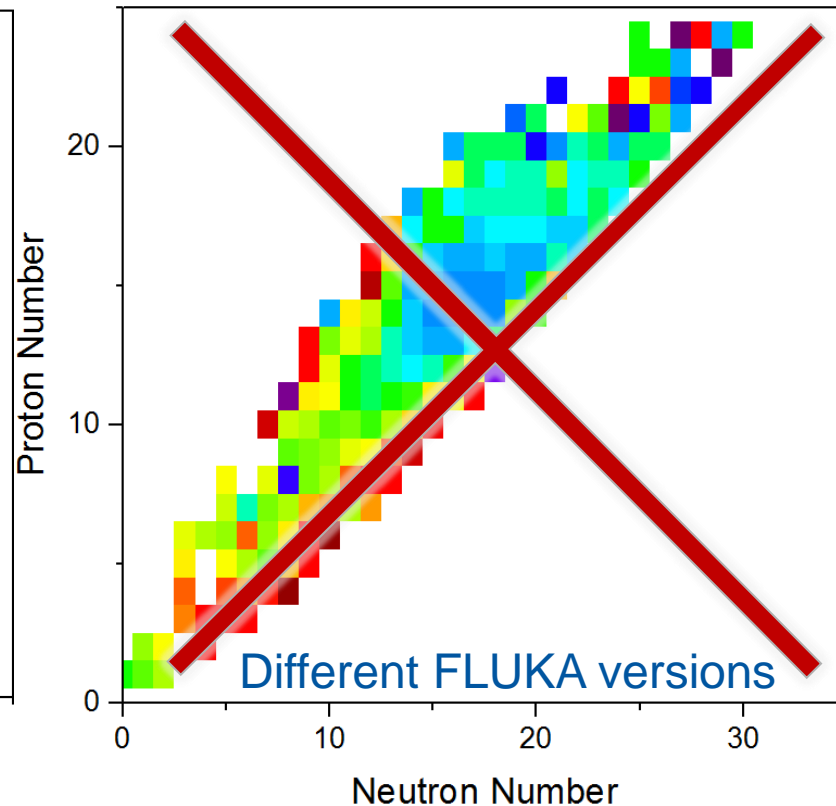
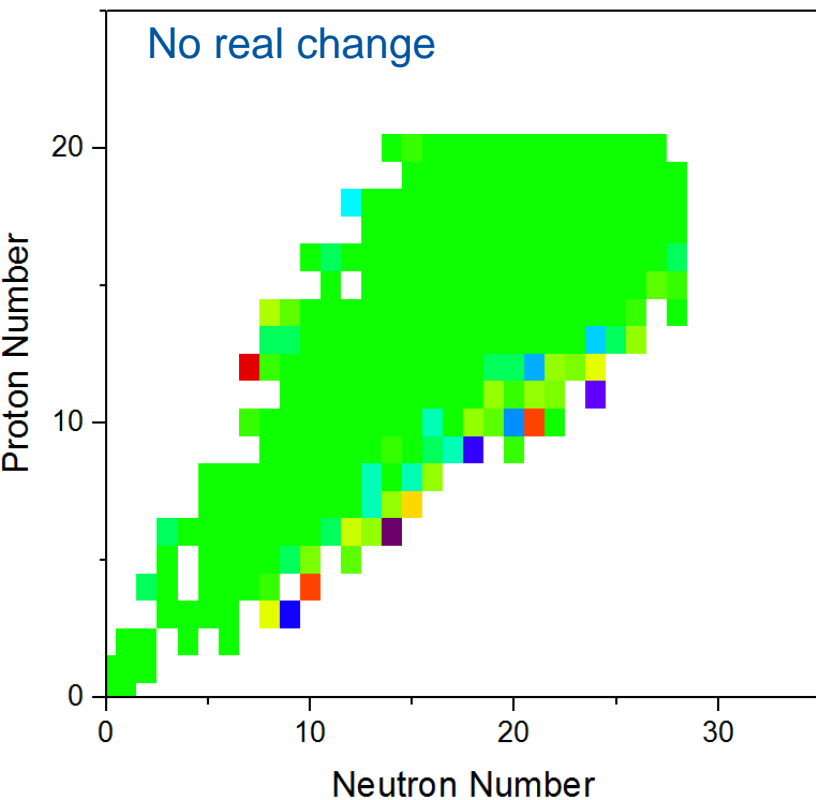




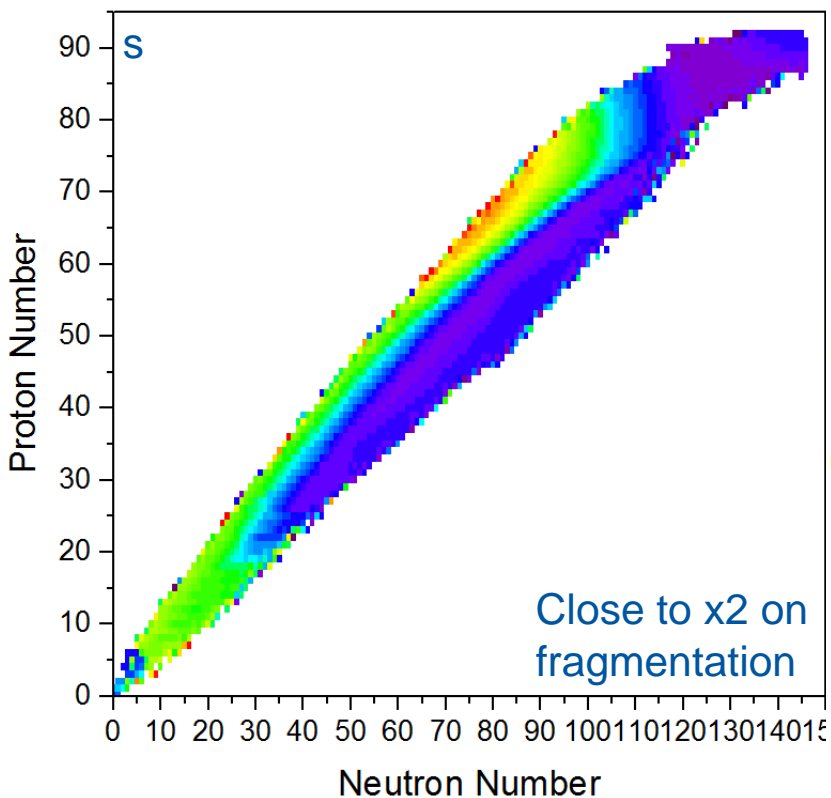
CaO target - ABRABLA

CaO target - FLUKA

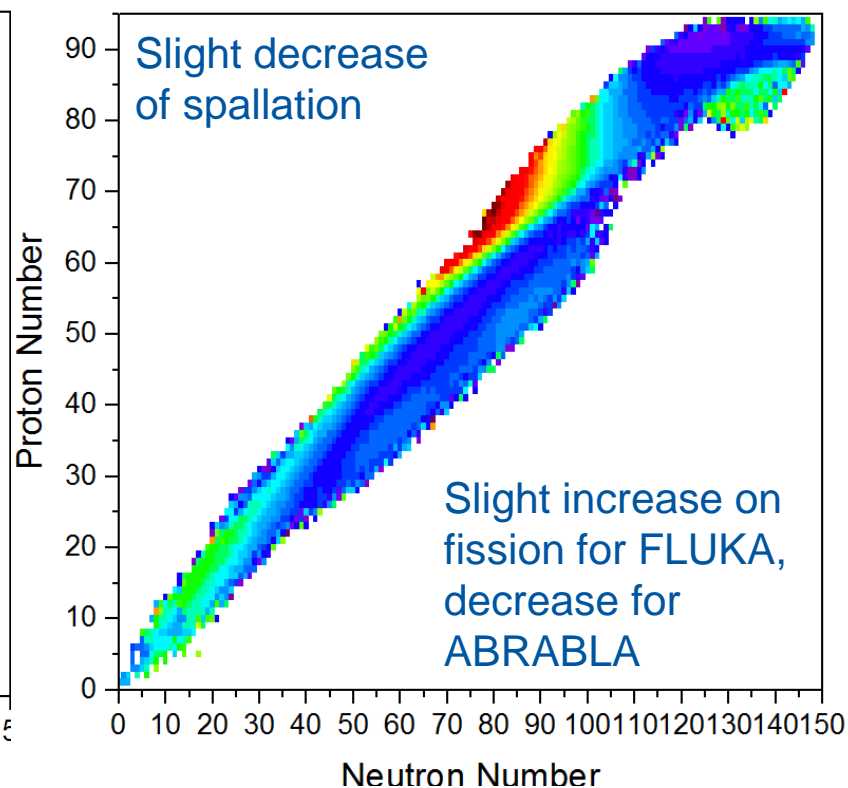
2.0 GeV/1.4GeV



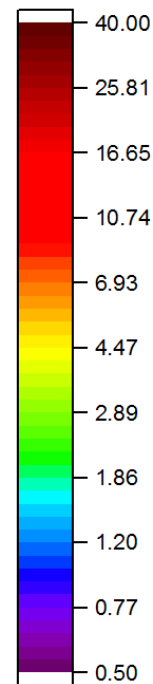
UCx target - ABRABLA



UCx target - FLUKA



2.0 GeV/1.4GeV



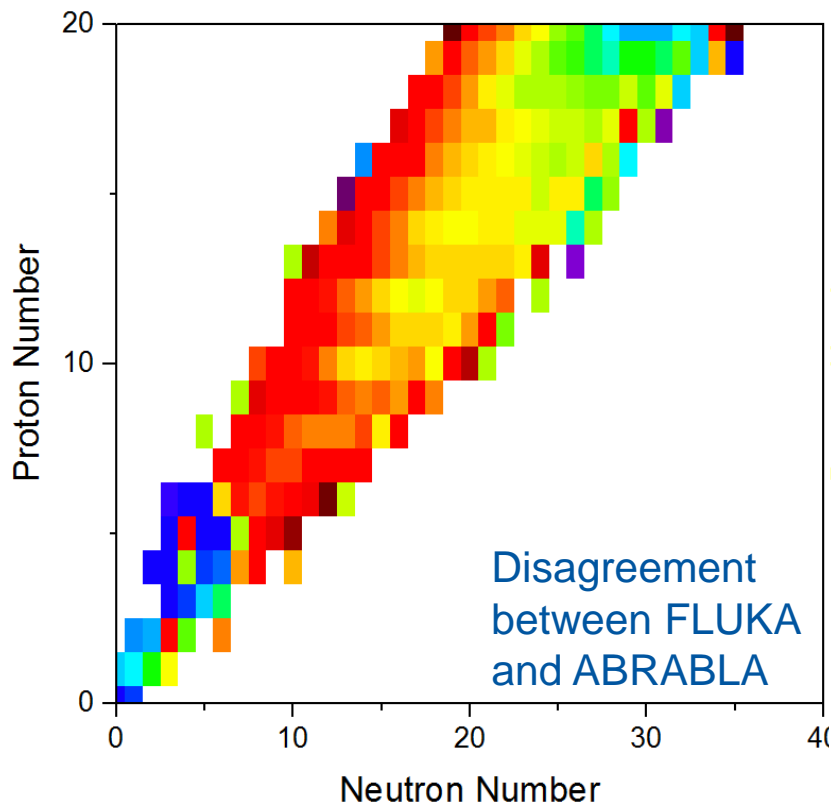
Both FLUKA 2017 v1.0

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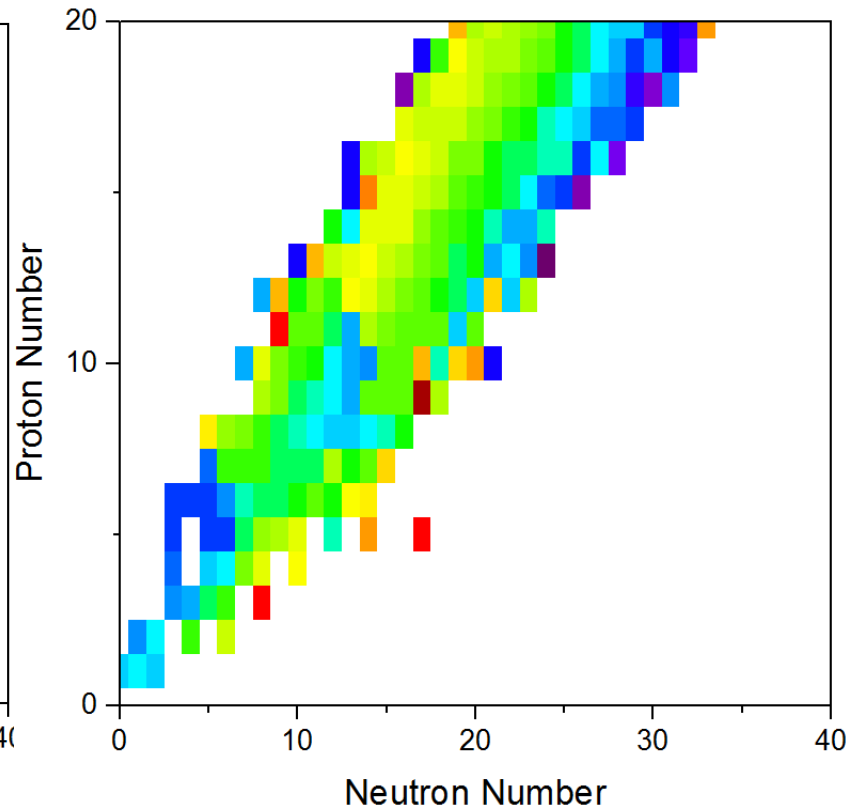


UCx

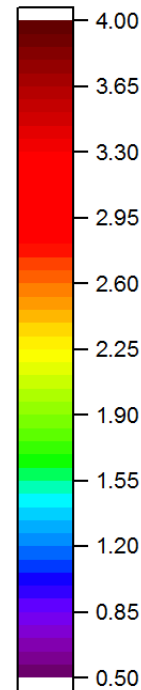
UCx target - ABRABLA



UCx target - FLUKA



2.0 GeV/1.4GeV



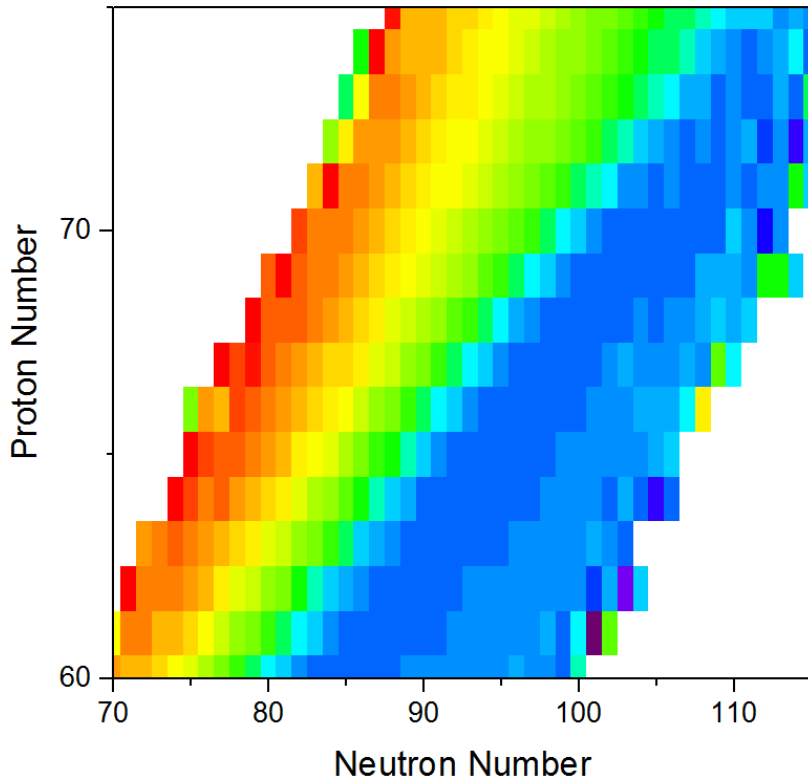
Both FLUKA 2017 v1.0

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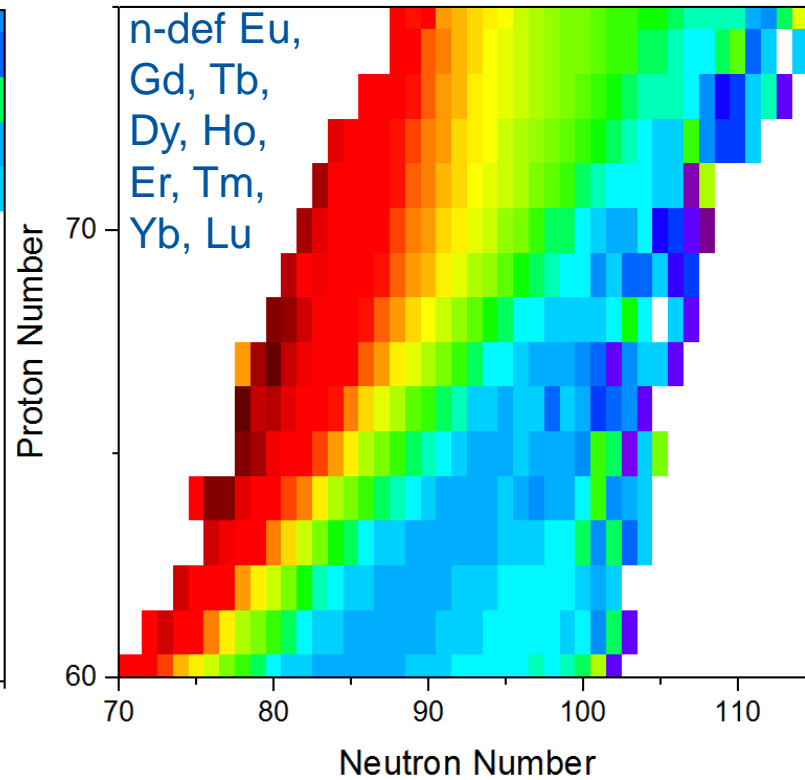


UCx ($Z > 20$)

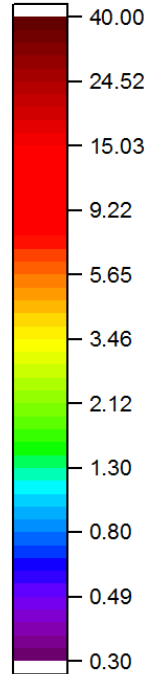
UCx target - ABRABLA



UCx target - FLUKA



2.0 GeV/1.4GeV



n-def Eu,
Gd, Tb,
Dy, Ho,
Er, Tm,
Yb, Lu

Both FLUKA 2017 v1.0

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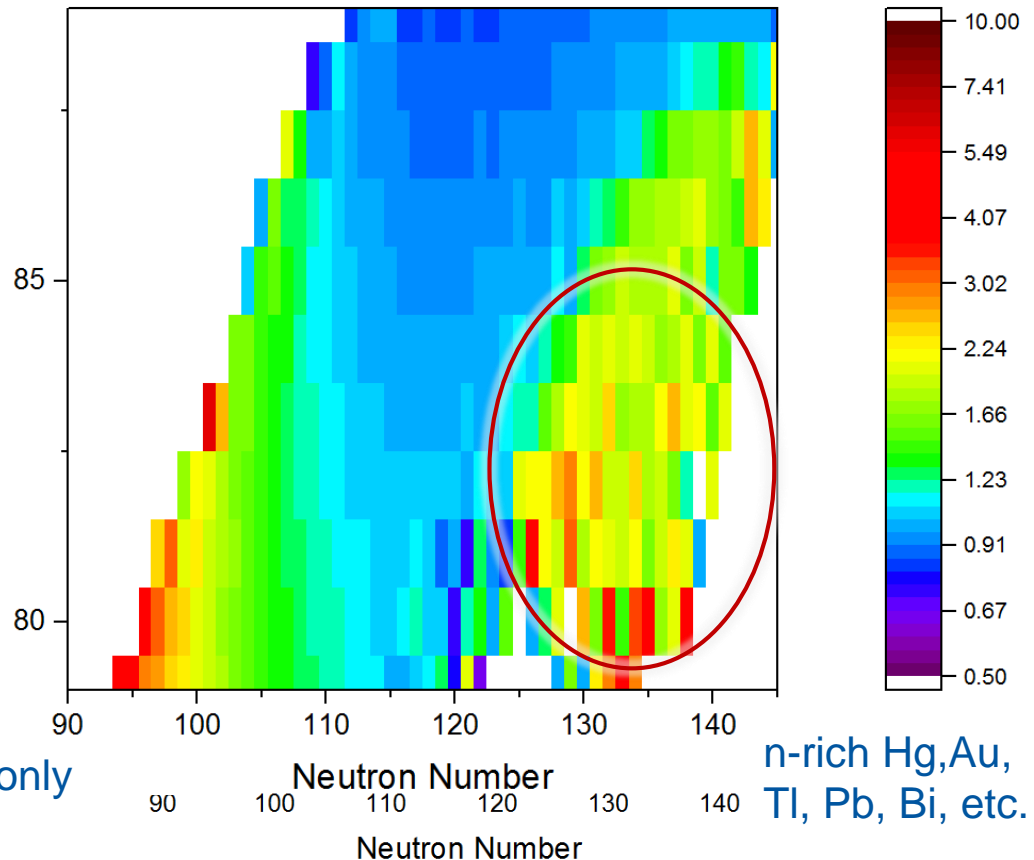
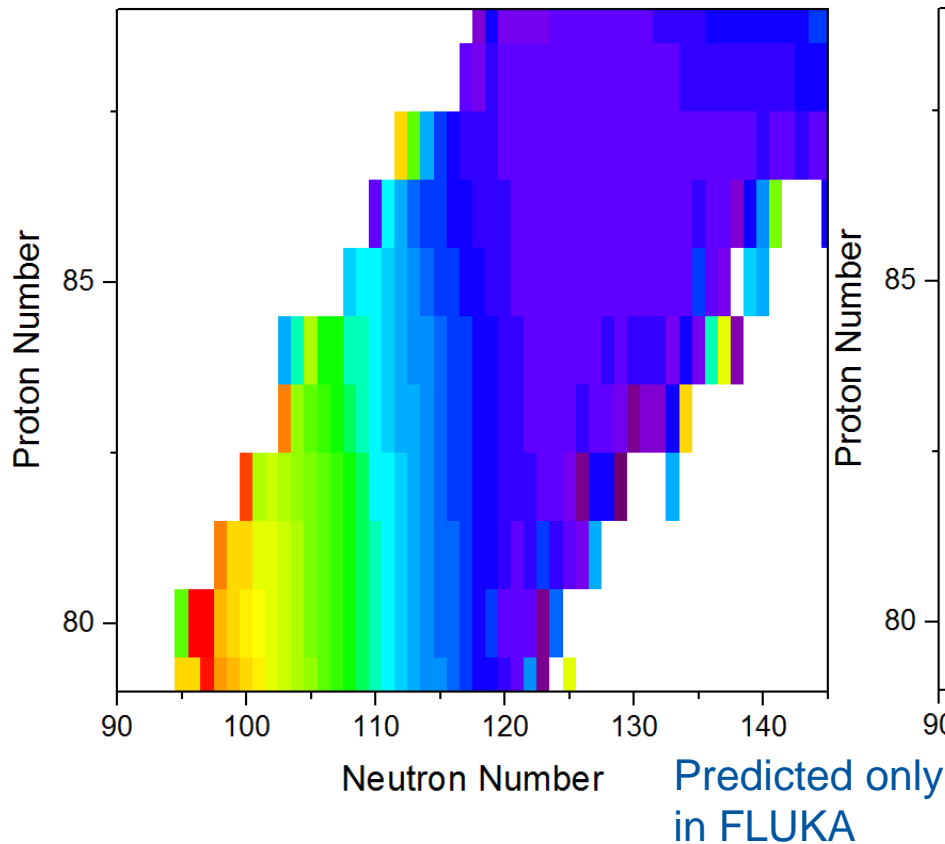
UCx ($60 < Z < 75$)



UCx target - ABRABLA

UCx target - FLUKA

2.0 GeV/1.4GeV



Both FLUKA 2017 v1.0

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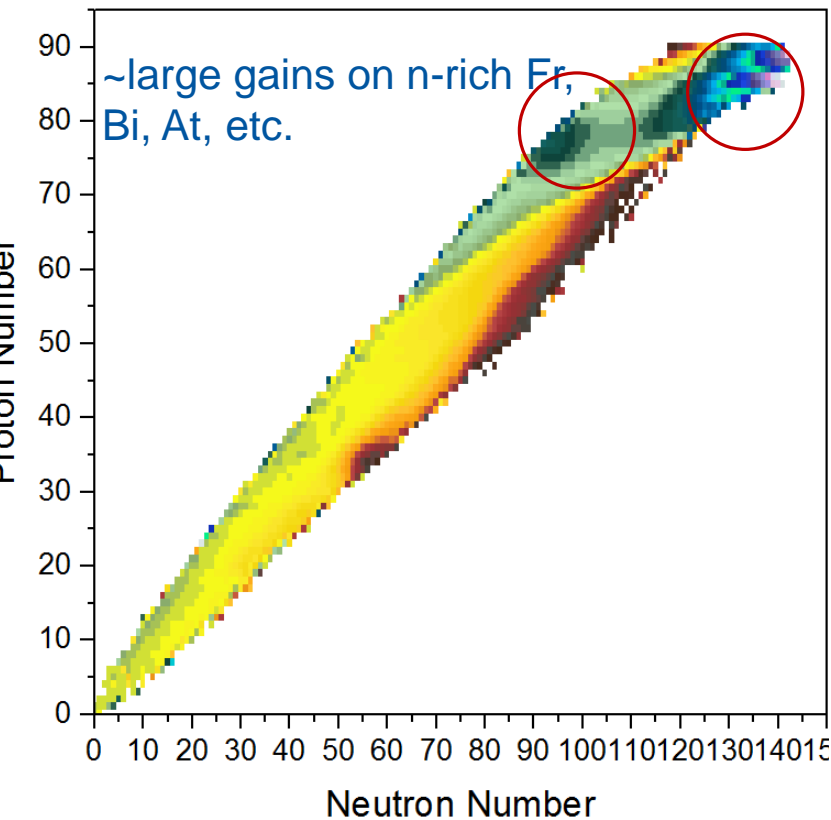
UCx ($79 < Z < 89$)



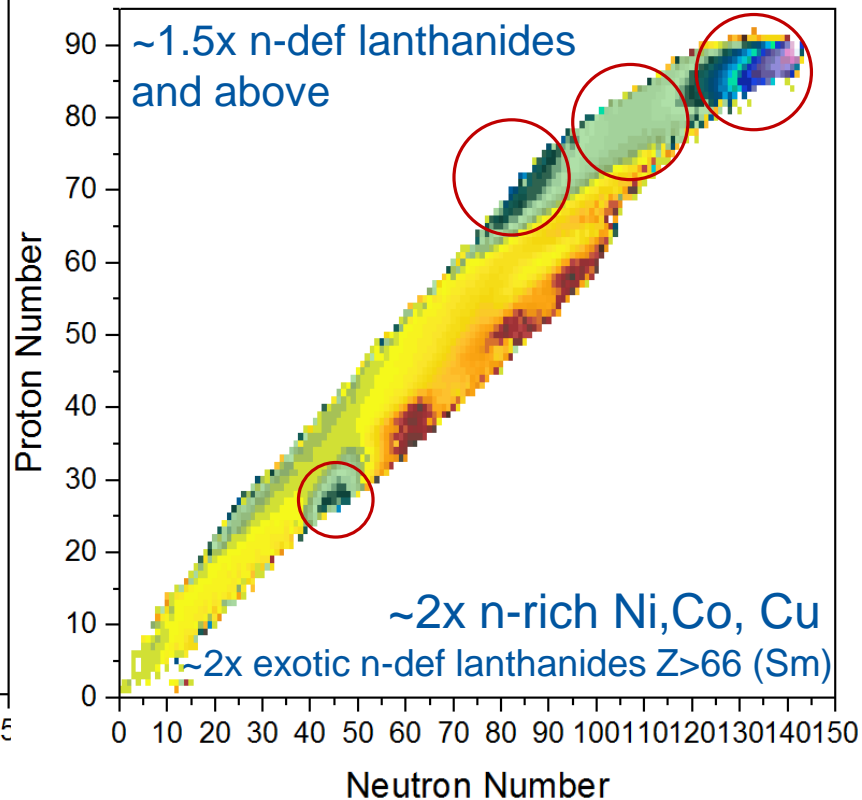
TODO

- Liquid target simulations are on going (Pb, Sn)
- Other materials

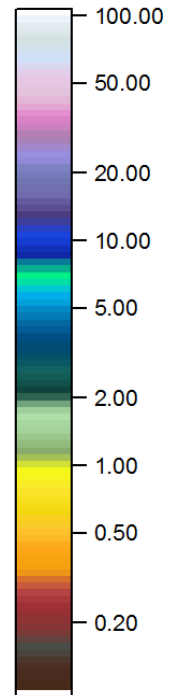
ThCx vs UCx target at 1.4GeV - ABRABLA



ThCx vs UCx target at 1.4GeV - FLUKA



ThCx/UCx



Assuming same mass as UCx (also ThC2 + 2C)

Both FLUKA 2011 v2x.1

ThCx vs UCx 1.4GeV

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Conclusions

- There are significant gains from the the 2GeV upgrade on heavy targets
 - Guaranteed and safe factors
- Light targets do not benefit much
- Need to discuss with ABRABLA and FLUKA groups to understand the differences (fundamentally different codes)
- Intensity upgrade will be most welcome (factor 3)
- ThCx targets may be produced again but need input from physics