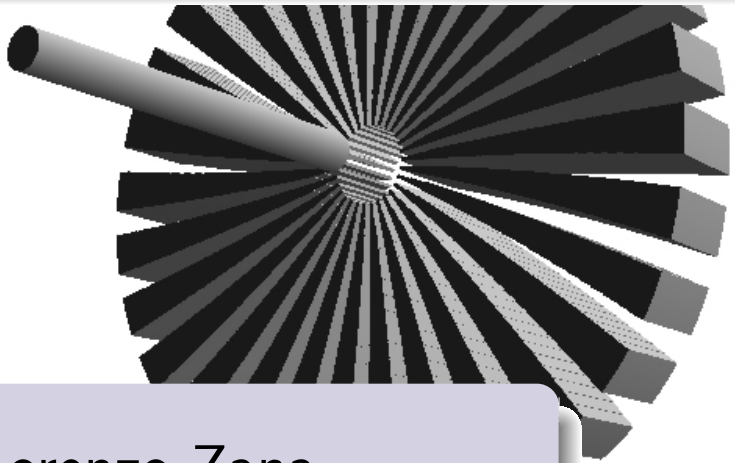
# ACTIVATION and BACKGROUND STUDY WITH SoLID (DRAFT)



Lorenzo Zana

Syracuse University

March 23 2013

1. Activation
   - Schematic
   - Test from RadCon at Jlab
   - Input from GEANT4
   - Implementation in FLUKA
   - Results on first baffle
2. Source from Target
   - Purpose
   - Deuterium
   - Helium3
3. Conclusions

# Schematic

## FLUKA

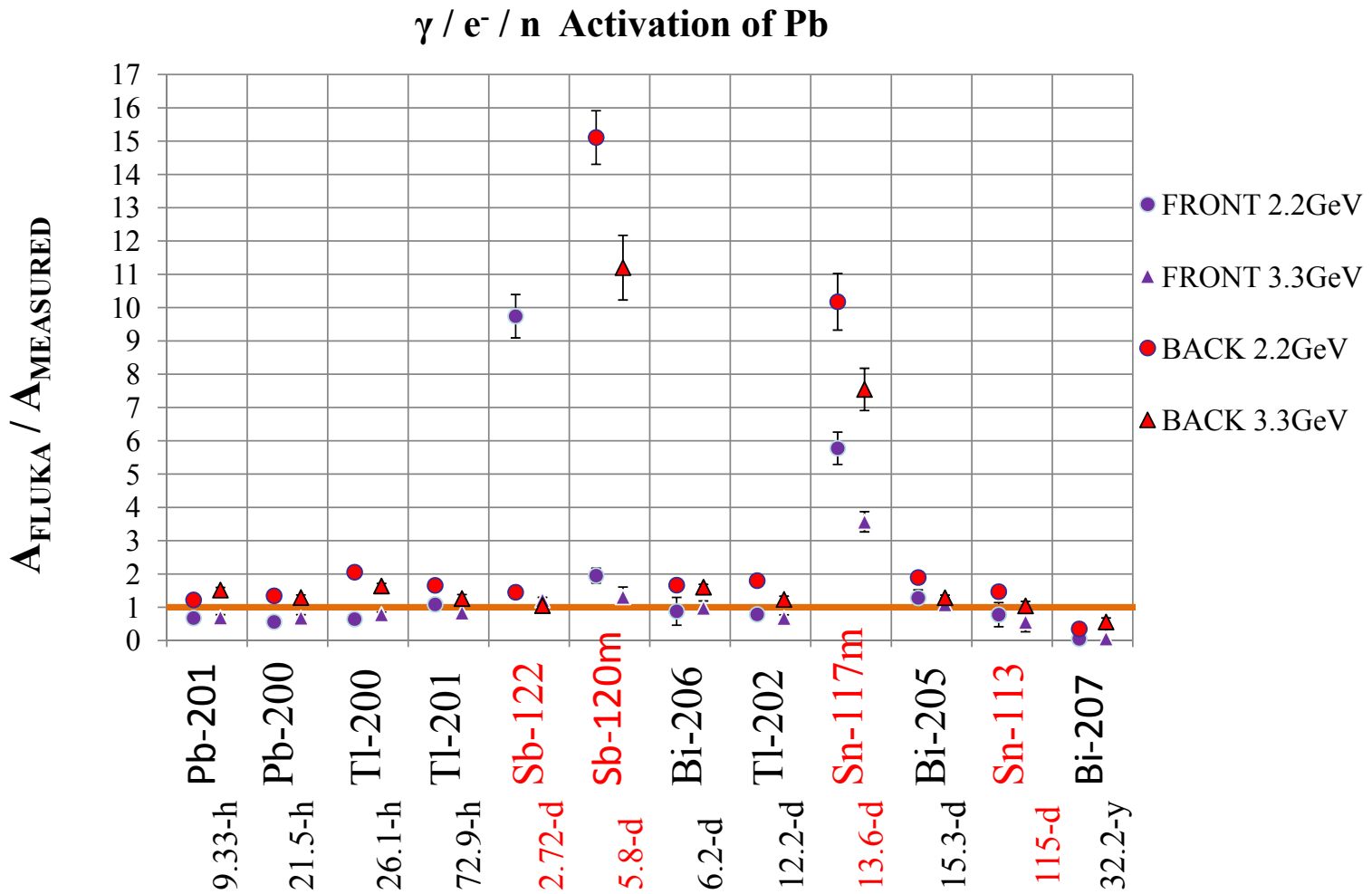
- Many good tools for activation and radiation estimates
- Geometrically limitations in producing more complex geometry (new baffle design)
- Poor estimation for hadron electro-production in our targets

## HOWTO

- Use GEANT4 as a source
- Input manually a source in FLUKA
- Use FLUKA tools and cross sections for energy deposition, activation, etc.

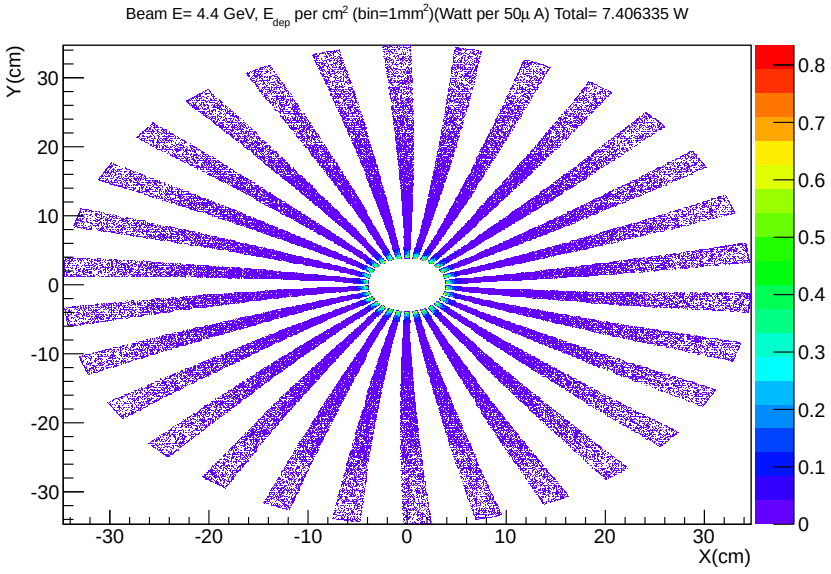
# Activation Test done at Jlab (from Kharashvili, G. talk)

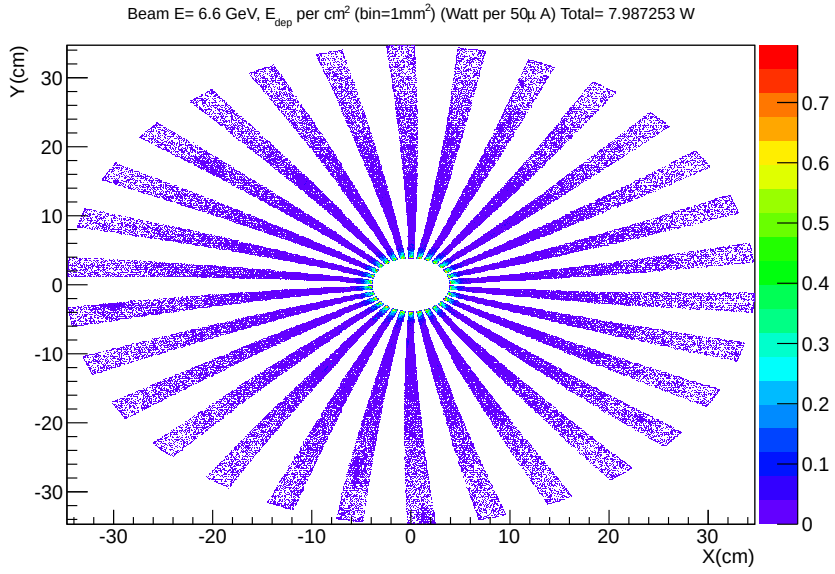
## Comparison FLUKA vs. Measurement



# Input from GEANT4

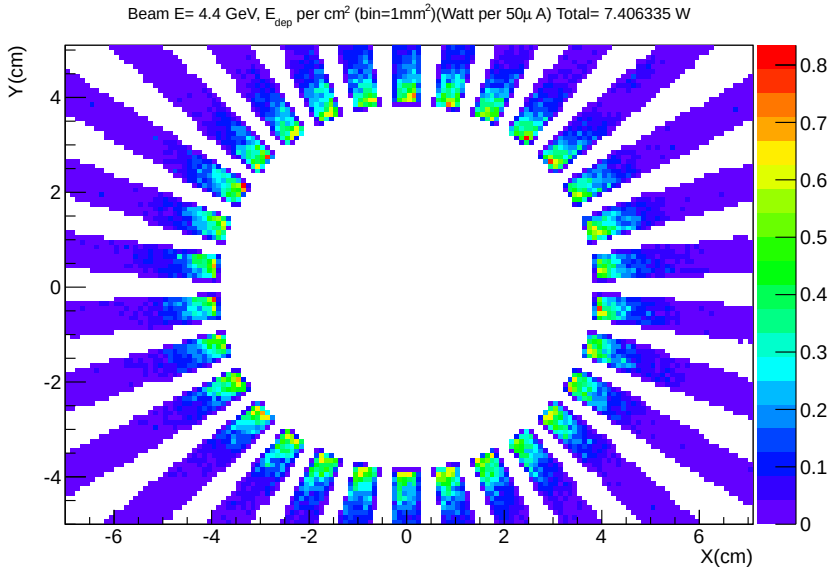
## Total power deposited $1^{st}$ Lead Baffle $\sim 88W$ (6GeV $50\mu A$)

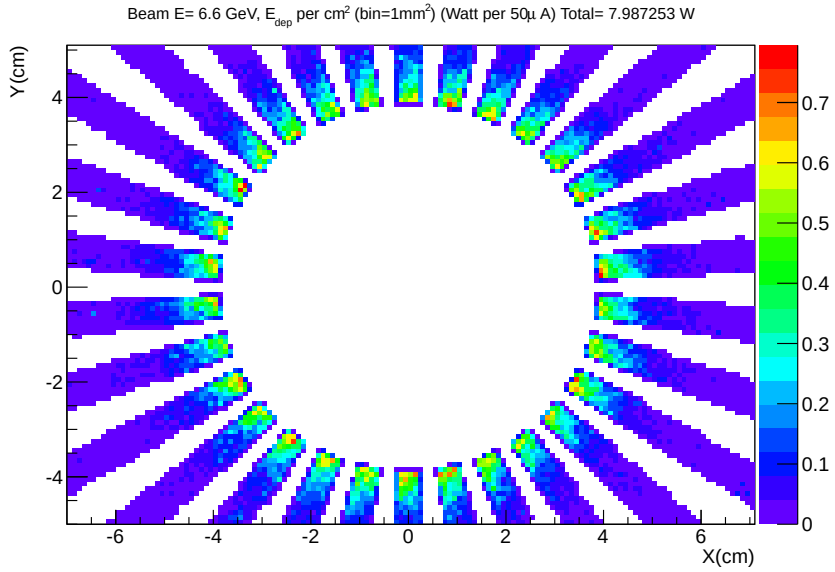


# Input from GEANT4

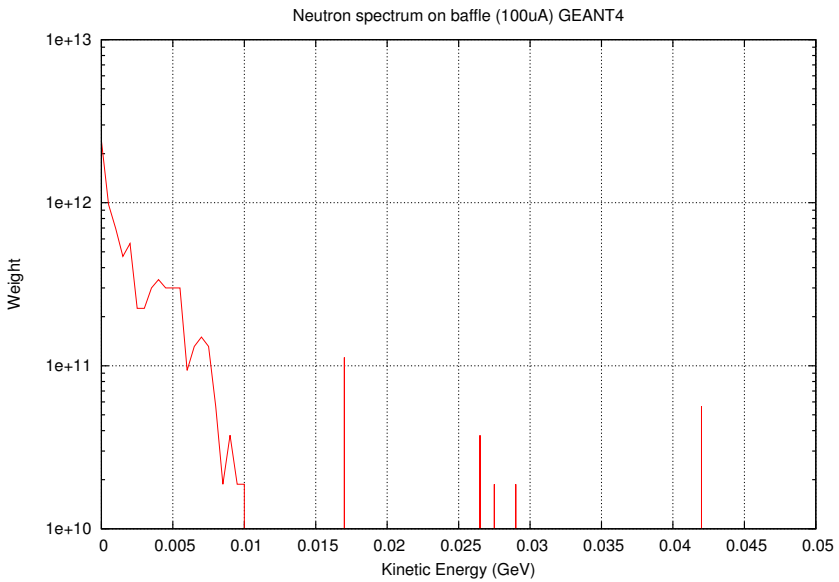
Total power deposited $1^{st}$ Lead Baffle $\sim 88W$ (6GeV $50\mu A$)



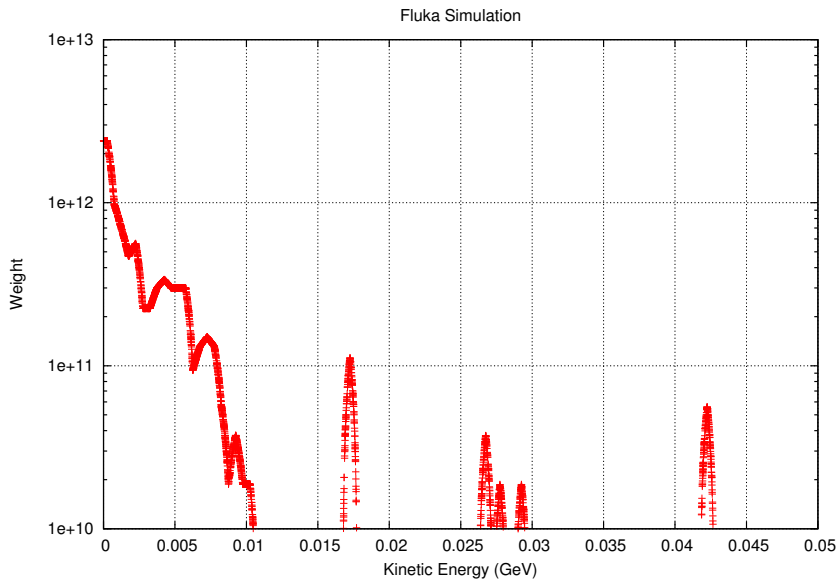



# Implementation in FLUKA (Neutron FLUX example)

## GEANT4

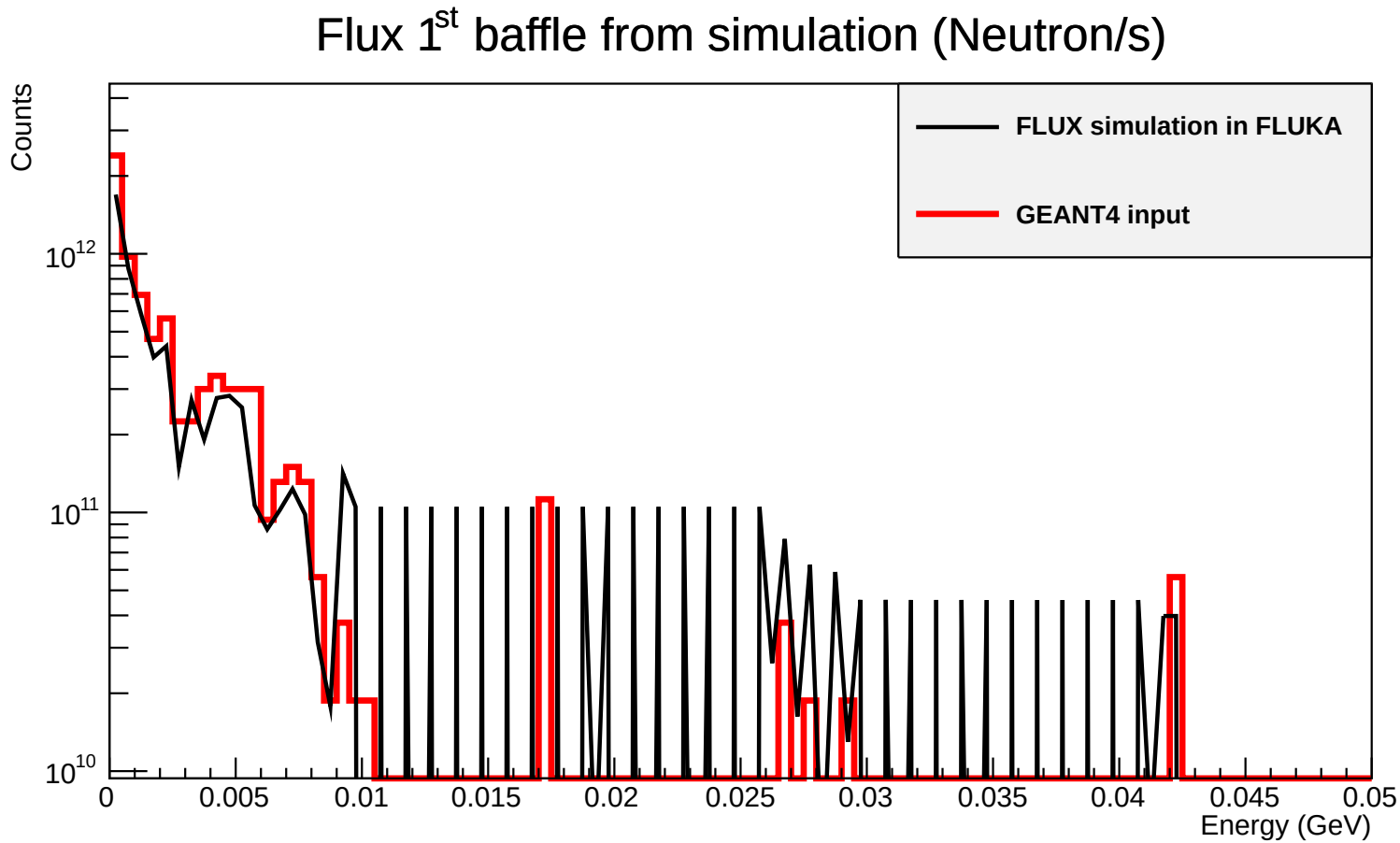



## Transfer to FLUKA



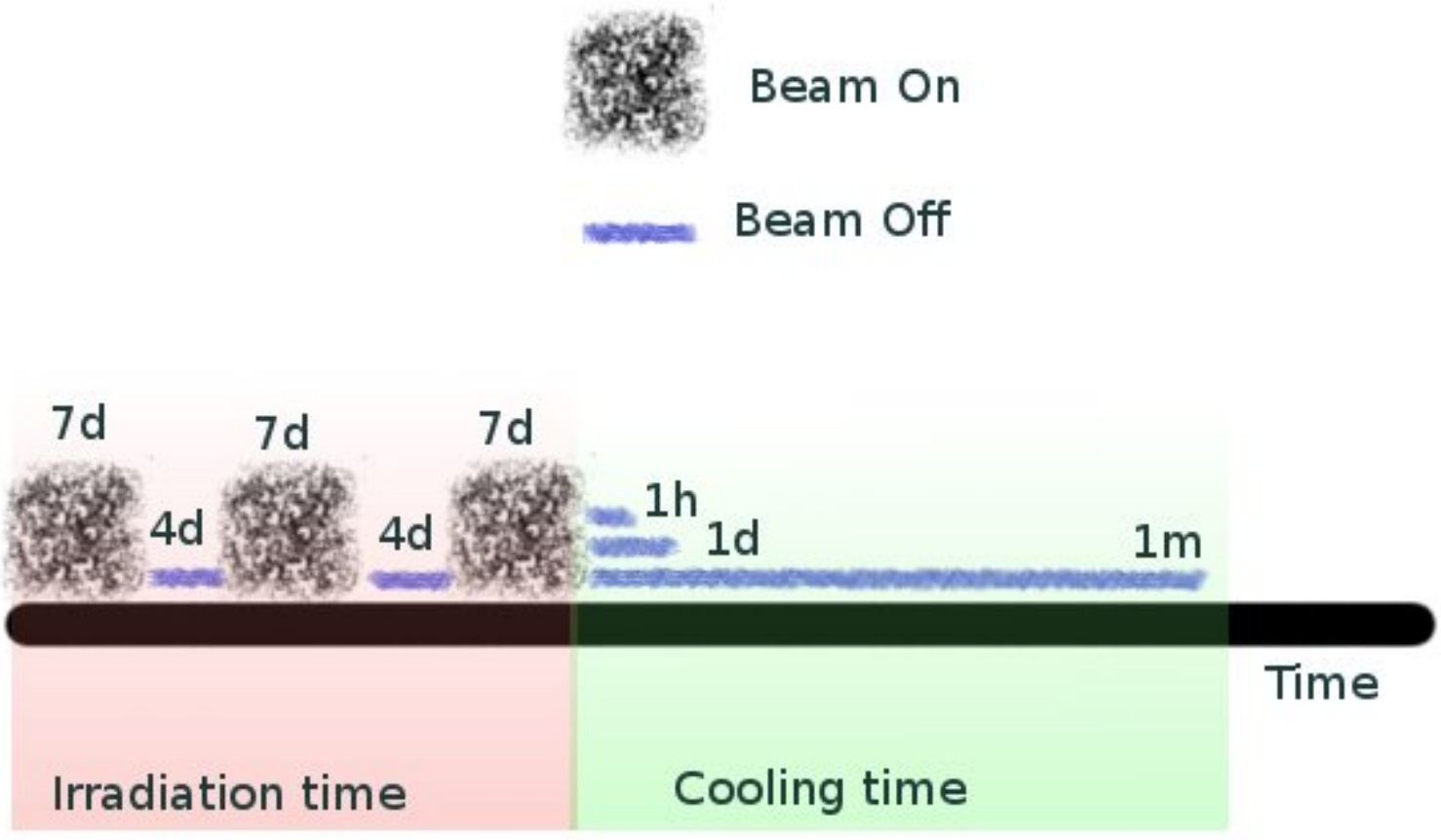
# Implementation in FLUKA (Neutron FLUX example)

Determination of weight (6GeV 100$\mu A$) for irradiation intensity



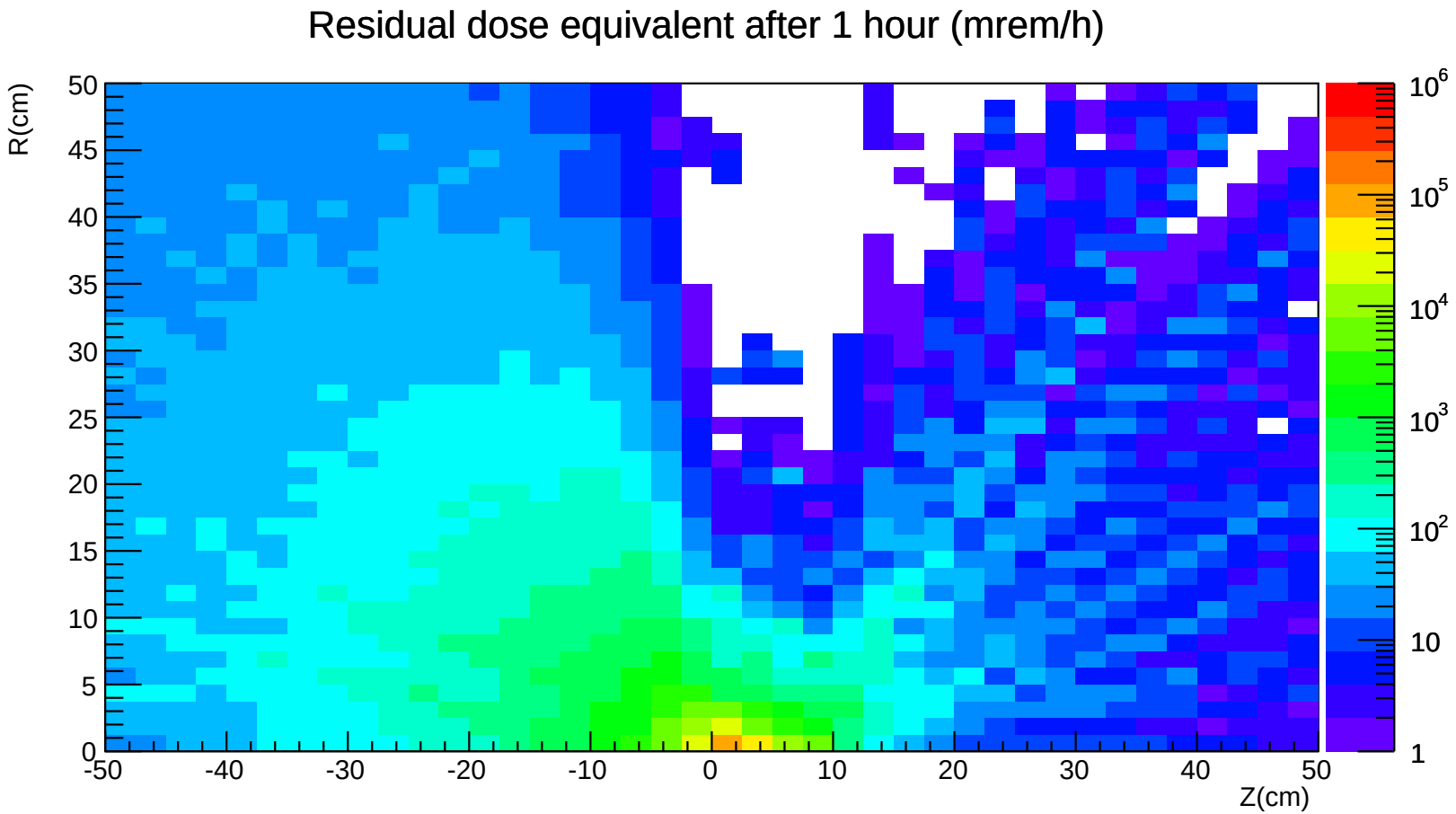
# Implementation in FLUKA (Neutron FLUX example)

Irradiation and cooling times



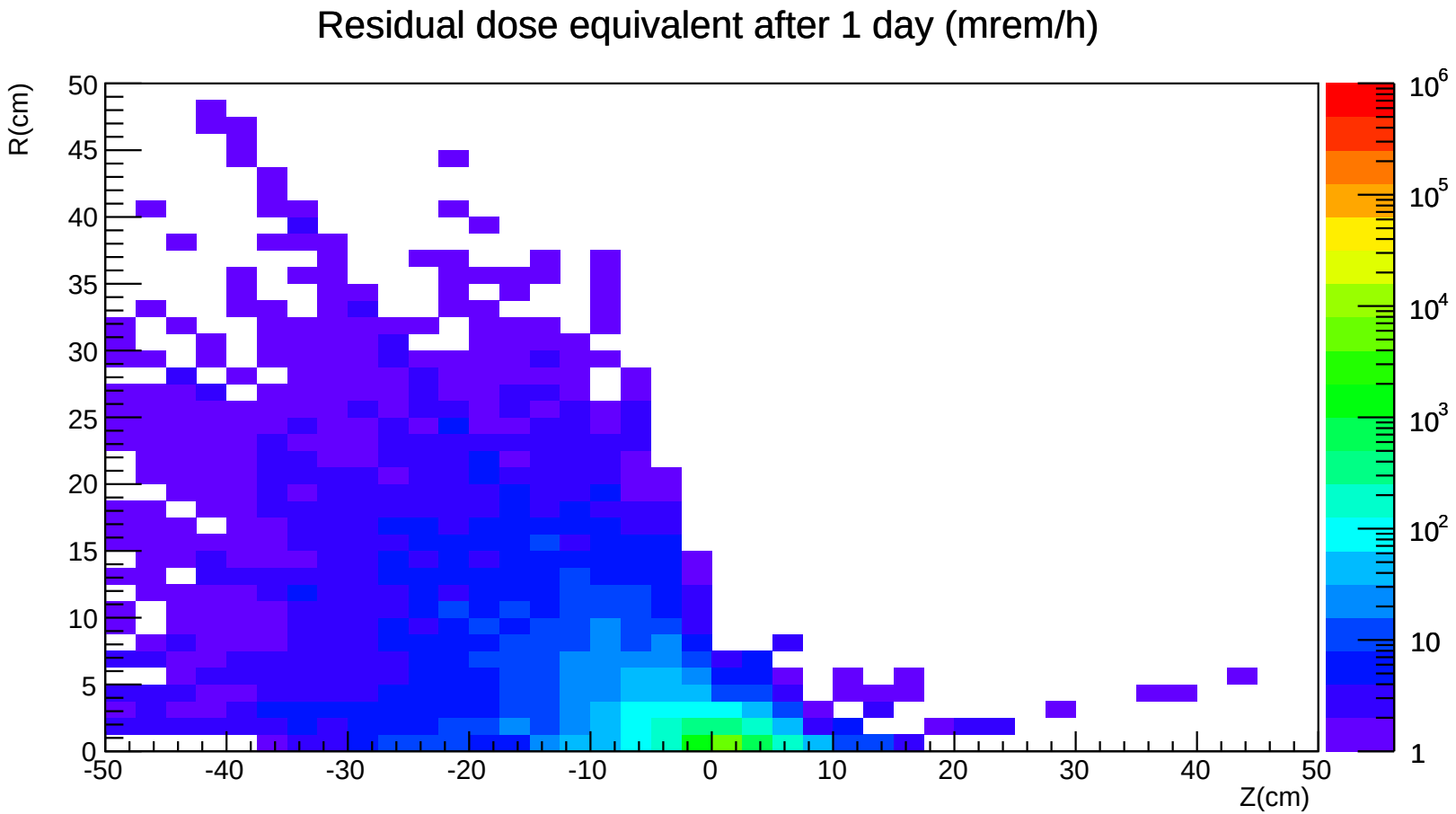
# Activation results on $1^{st}$ baffle (n+p+e+$\gamma$)

Cooling time of 1 hour



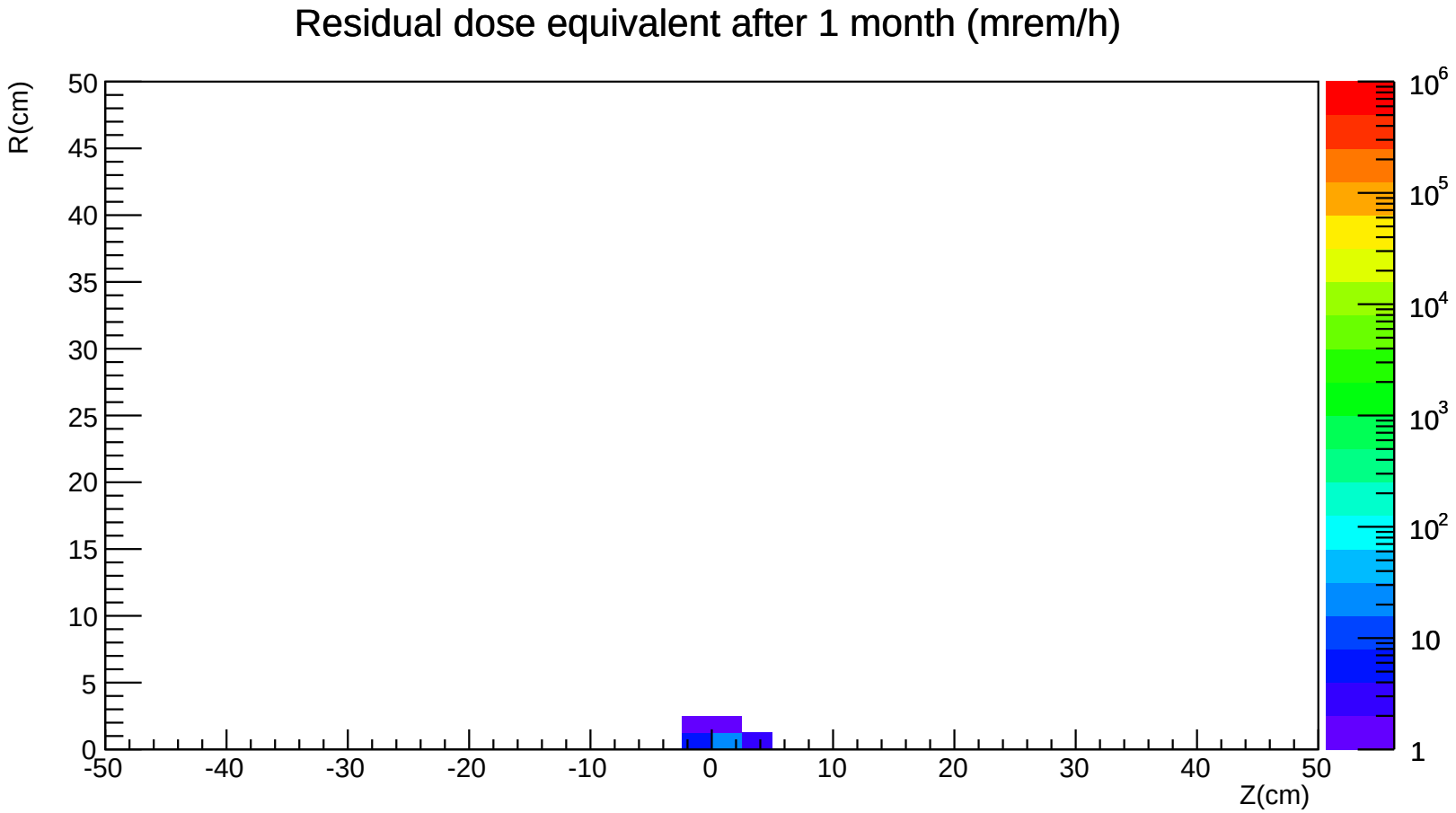
# Activation results on $1^{st}$ baffle (n+p+e+$\gamma$)

Cooling time of 1 day



# Activation results on $1^{st}$ baffle (n+p+e+$\gamma$)

Cooling time of 1 month



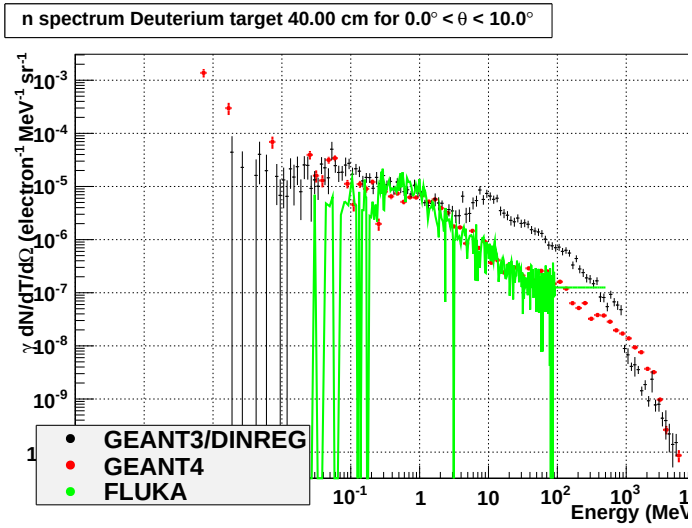
# Source from Target

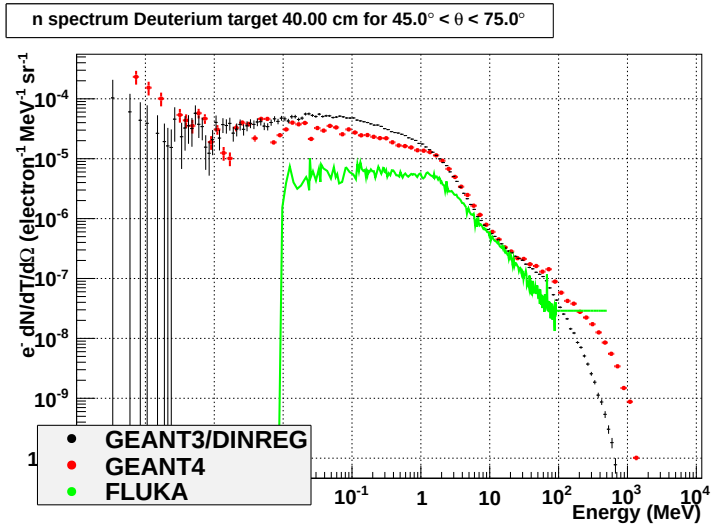
## Implementation of common source from target for GEANT4 and FLUKA

I am working on constructing a common source term from the target evaluating the input from:

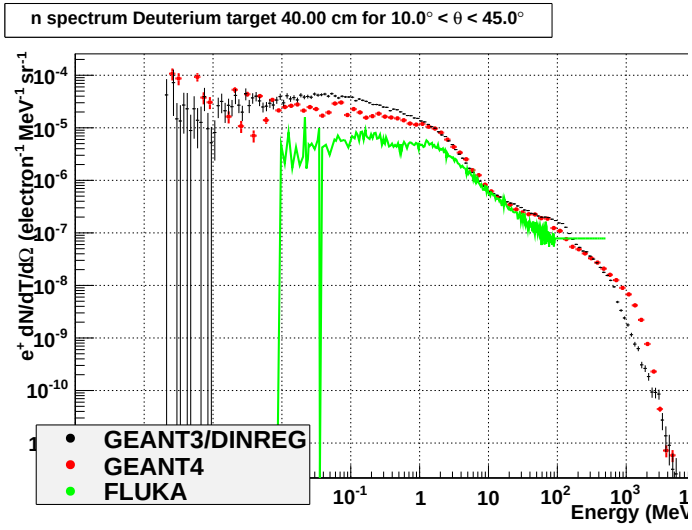
- GEANT4
- GEANT3/DINREG (Pavel)
- Deuterium and He3 target

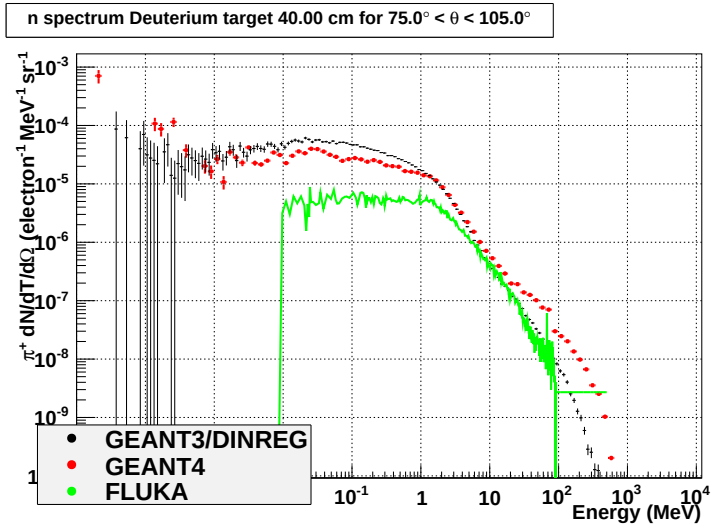
# Deuterium source comparison



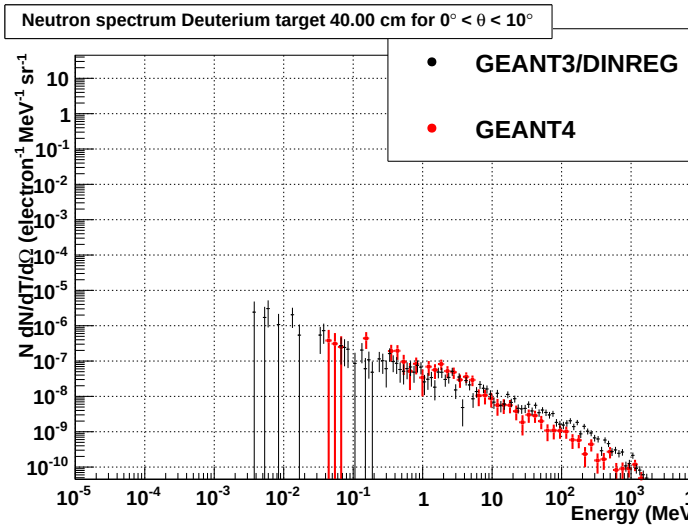



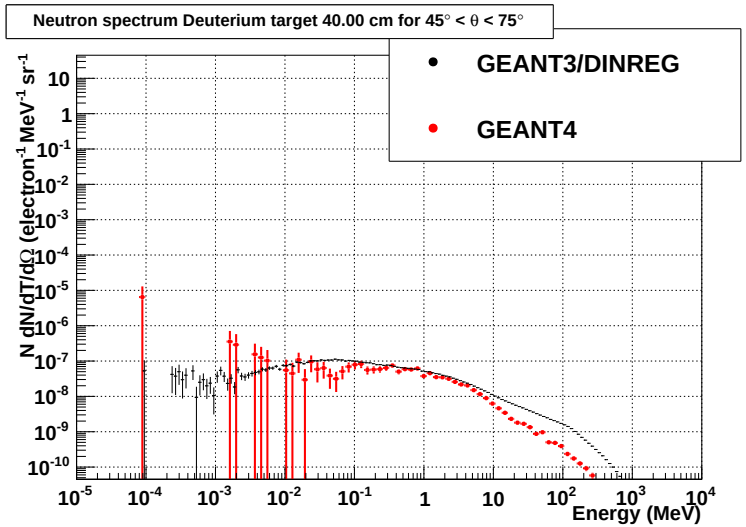

NEUTRON



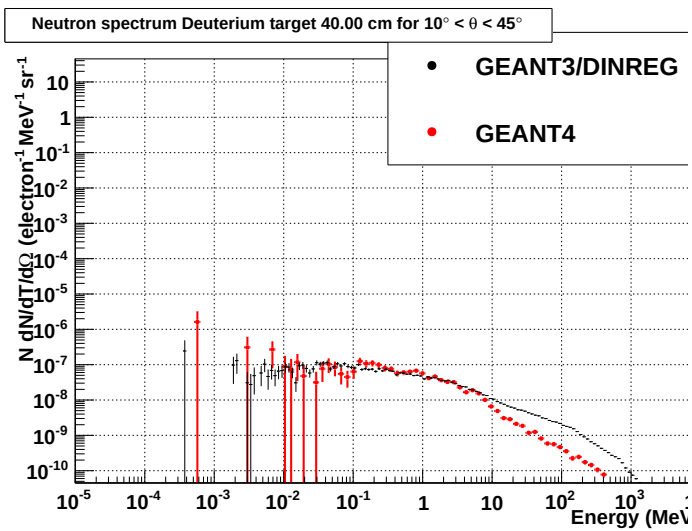



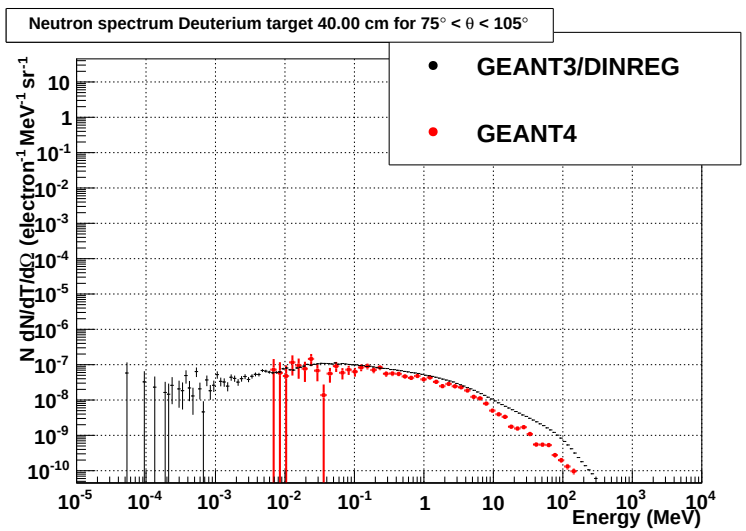
# Helium3 source comparison (with target windows)




NEUTRON



# Conclusions

## Conclusions

- Activation study: in progress
- Common source construction: in progress