Exercise 13: Activation

FLUKA Beginner's Course

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Aim of the exercise:

1- Description of an irradiation profile

2- Definition of cooling periods

3- Use of EMFCUT card

4- Evaluation of activity

5- Evaluation of dose equivalent

Exercise 13: Activation

- Start from the solution of ex5 (copy both inp and flair files):

  mkdir ex13 ; cp ex5/ex5.* ex13/. ; cd ex13

- Add irradiation profile:
  - 3 irradiation periods of 7 days separated by 4 days of shutdown
  - Intensity: 10^5 protons/second per each period
- Consider 2 cooling periods: 1 hour and 1 month
- Kill the prompt part of the electromagnetic cascade
- Set 10 keV production and transport thresholds for photons
- Set 100 keV production and transport thresholds

  for electrons and positrions

Exercise 13: Activation

For both aluminum and lead and for both cooling times:

- Add scoring of *specific activity* in Bq/cm^3
- Do both with USRBIN (unfmt 63) and with RESNUCLE (unfmtd 61 & 62)
- Persuade yourself the two scorings give the same results

To compare results: format the USRBIN summary file inside FLAIR

For both cooling times:

- Calculate the dose equivalent rate around the target
- Use R-Φ-Z USRBIN (unformatted unit 64): X=0 cm , Y=0 cm ,
  R: 10 cm 100 bins, Φ: 1 single bin, Z: 200 bins from -5 to 15 cm
- Use the conversion coefficients for *effective dose*
  (identifier 'EWT74', selected with the AUXSCORE card)

Run 5 cycles x 1000 primaries