Collimation work at STFC

from PAC'09 paper by J.L. Fernandez-Hernando, D. Angal-Kalinin, R. Losito, V. Vachloudis

2nd SPL collaboration meeting, May 2009

Goals

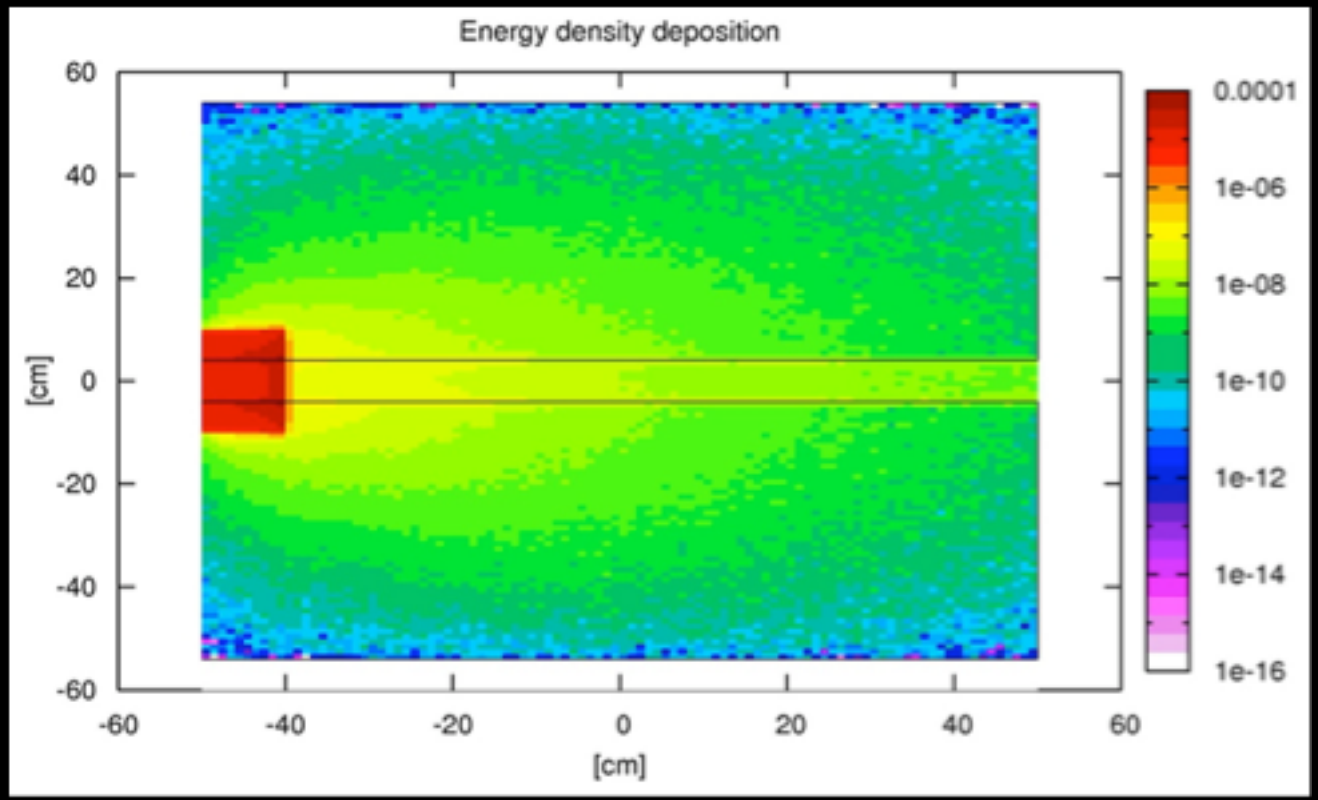
- collimator design for Linac4,
- beam collimation of 10, 20, 50 W, at 50, 100, 160 MeV,
- collimation in Linac4-PSB transfer line,
- material composition, activation of downstream elements, shielding requirements

"Collimation summary", SPL 2nd collaboration meeting, TRIUMF May 2009, F. Gerigk

energy deposition

50 W beam collimation at 160 MeV:

- use cylindrical collimators with low-Z materials,
- most of the energy deposited in the first 10 cm of 1 m long graphite cylinder:



Energy density deposited in a graphite cylinder by 50 W of beam. The units are GeV/cm^3/primary

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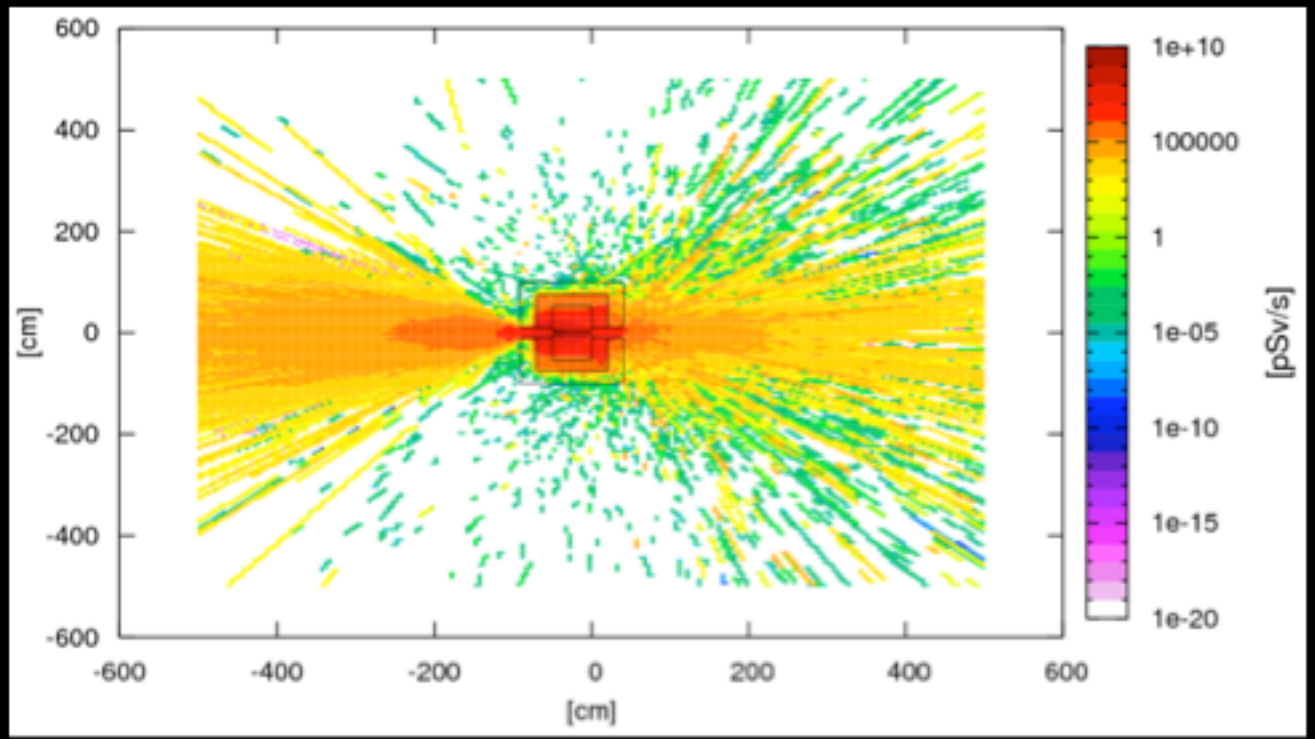
equivalent dose rate

50 W beam collimation at 160 MeV:

- using a 50 cm graphite collimator and concrete/lead shielding around the collimator,
- dose rate after 1 month of operation and 1 day of cool-down,



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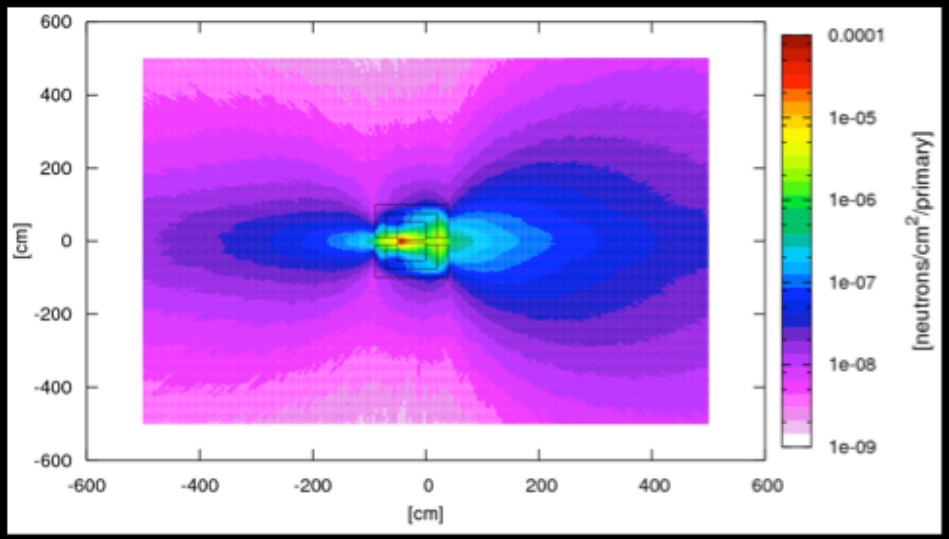
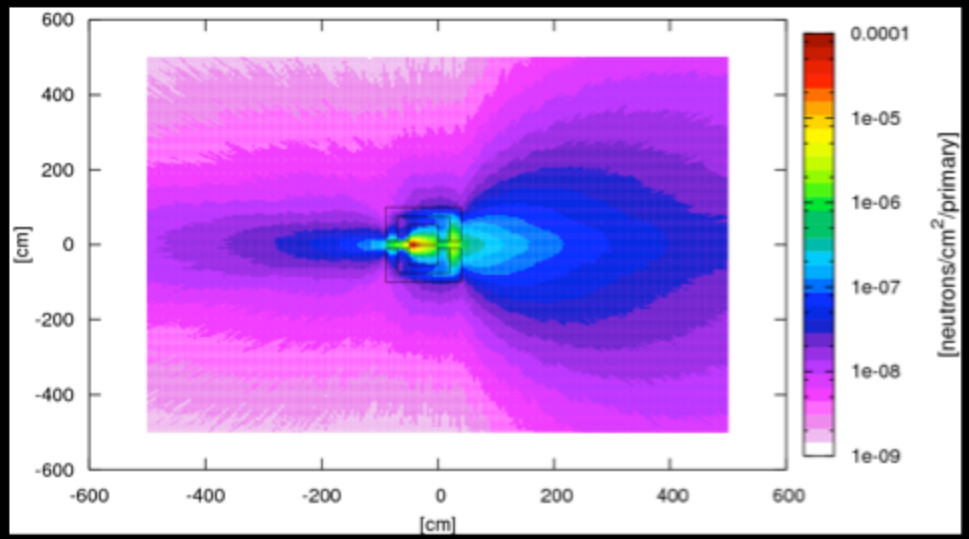
shielding comparison

50 W beam collimation at 160 MeV:

- neutron fluence per primary beam particle





concrete / lead shielding

borated paraffine / lead shielding

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next steps:

- lower power beam collimation (10, 20 W) at 50, 100, 160 MeV,
- determine size of collimator+shielding,
- activation of neighbouring elements,