

Mammography test

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Short description: The aim of the test is to validate the estimates of a Geant4 Monte Carlo code for breast dosimetry application at the level of local dose deposition (i.e., in small sensitive volumes) and in absolute terms. The MC geometry reproduces the experimental mammography setup of the SYRMEP beamline of the Elettra synchrotron light-source in Trieste (Italy). Experimental measurements have been performed irradiating thermoluminescent dosimeters (i.e., TLD 100H) with a monoenergetic x-ray beam at 20 keV. The air kerma was used to normalize the MC data to the experimental ones.

Reference publication:

- C. Fedon, M. Caballo, R. Longo, A. Trianni, I. Sechopoulos, "Internal breast dosimetry in mammography: Experimental methods and Monte Carlo validation with a mono-energetic X-ray beam", Med. Phys. 45 (4), 2018.
- C. Fedon, M. Caballo, I. Sechopoulos, "Internal breast dosimetry in mammography: Monte Carlo validation in homogeneous and anthropomorphic breast phantoms with a clinical mammography system", Med. Phys. 45 (4), 2018.

Geant-val layout: Mammo

Reference data: In-house experimental measurements performed using TLD-100H detectors. The dosimeters, embedded in a homogeneous semi-cylindrical breast phantom which reproduces the 50% glandular breast material, have been irradiated by a monoenergetic, parallel synchrotron radiation beam (@20 keV).

Tested EM physics constructors:

- *EMStandard_opt0*
- *EMStandard_opt3*
- *EMStandard_opt4*
- *Livermore*
- *Penelope*

-- Christian Fedon - 2019-05-07

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