P.019 THE ENTROPY OF AN X-RAY BEAM

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The concept of entropy allows a new approach of the radiation physics. In recent works we introduced the entropy of a radiation beam to describe the energy degradation of primary photons of a monoenergetic beam incident in a material. In this work we expanded this application to the study of an X-ray polyenergetic beam. With this new approach we found that the filtration of an X-ray tube decreases the entropy of the output beam. The entropy can be expressed as function of the filtration and the voltage of the X-ray tube. We studied the entropy of the distribution of the energy deposited in water as a function of the depth and compared with the results for monoenergetic beams. We considered water as scatter medium and a beam of photons with perpendicular incidence in a half-extended geometry. The Monte Carlo method was used to simulate the radiation scatter in water.

P.020 STUDIES ON ENERGY RESPONSE OF GRAPHITE MIXED $CaSO_4$:Dy PELLETS FOR LOW ENERGY X - RAY DETECTION

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Sintered pellets of CaSO4:Dy + Teflon with thickness between 0.2 and 0.8 mm and with graphite content from 0 to 20 % were investigated for application in low energy photon dosimetry. The effective X - ray energies used were: 14.3, 21.2, 31.2, 37.3, 64.4, 74.5 and 92.3 keV. The studied parameters were the relative sensitivities, lower detection limits and energy responses. Pellets 0.8mm thick and with 5% graphite content showed the best results, when aiming at the lowest relative TL response for X-rays with an effective energy of 31.2 keV.

P.053 EFFECTIVE ENERGY DETERMINATION OF RADIATION INCIDENT ON A MONITOR

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This paper presents methods for determination of the effective energy (Eeff) of radiation incident on a monitor which contains 4 thermoluminescent (TL) detectors: two CaF2 pellets and two TLD-100, (one of each type within lead filter and the other without any filter). Curves of TL response/air kerma vs photon effective energy (Eeff) for each detector were experimentally obtained. The blind performance testing for the determination of Eeff of the radiation incident on the dosemeter free-in-air and on a slab water phantom was performed. For this test, monitors were irradiated with photons of 34, 61 and 130 keV nominal Eeff and for each energy with angle of incidence of 0, 30, 45 and 60°. This paper describes the best combination of detectors with or without lead filters to determine the Eeff. This value will be used to correct the TL response of detectors due to its energy dependence, for further calculation of operational dosimetric quantities.