

ABSTRAK

Telah dilakukan simulasi analisis penggunaan filter eksternal pada pesawat sinar-X terhadap dosis serap menggunakan program PHITS. Tujuan penelitian menentukan jenis material yang dapat digunakan untuk memfilter sinar-X bremsstrahlung, meninjau karakteristik sinar-X bremsstrahlung yang telah mengalami filtering dan mengamati pengaruh filter terhadap dosis serap. Metode yang dilakukan menggunakan simulasi berbasis *Monte Carlo*. Filter yang digunakan filter Aluminium, Tembaga dan Timbal. Uji dilakukan pada tegangan 115 KV, 120 KV, dan 125 KV dengan ketebalan 0.1 mm dan 1.5 mm. Hasil penelitian diperoleh semakin tebal filter maka akan menurunkan intensitas sinar-X. Filter terbaik didapatkan filter Aluminium karena filter tersebut mampu mengurangi intensitas sinar-X karakteristik dan mampu meneruskan berkas ke phantom serta meningkatkan intensitas sinar-X bremsstrahlung. Penggunaan filter juga mempengaruhi dosis serap yang diterima pada phantom.

Kata Kunci : Sinar-X karakteristik dan bremsstrahlung, Filter Sinar-X, PHITS.

ABSTRACT

A simulation of the analysis of the use of an external filter on an X-ray machine on the absorbed dose has been carried out using the PHITS program. The purpose of this research is to determine the type of material that can be used to filter bremsstrahlung X-rays, review the characteristics of bremsstrahlung X-ray that have undergone filtering and observe the effect of the filter on the absorbed dose. The method used is a Monte Carlo-based simulation. Filters used are Aluminium, Copper, and Lead filters. The test were carried out at voltages of 115 KV, 120 KV, and 125 KV with a thickness of 0.1 mm and 1.5 mm. The results obtained that the thicker the filter is obtained by the Aluminium filter because can reduce the intensity of the characteristic X-rays and can forward the beam to the phantom and increase the intensity of the bremsstrahlung X-rays. The use of filters also affects the absorbed dose received dose on the phantom.

Keywords : X-ray characteristics and bremsstrahlung, X-ray filter, PHITS.

