

ABSTRAK

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Proram Studi : Fisika
Judul : Evaluasi Simulasi *Monte Carlo* FLUKA terhadap Pengukuran Laju Paparan Radiasi pada Ruang CT Scan RSUD Bandung Kiwari

Penggunaan pesawat sinar-X pada ruang CT Scan berpotensi menimbulkan paparan radiasi di lingkungan sekitar sehingga diperlukan evaluasi terhadap efektivitas proteksi radiasi. Penelitian ini bertujuan untuk memperoleh dan memvalidasi nilai laju paparan radiasi melalui pengukuran eksperimen menggunakan *surveymeter* dan simulasi *Monte Carlo* FLUKA pada ruang CT Scan RSUD Bandung Kiwari. Hasil eksperimen menunjukkan laju paparan sebesar 0,078–0,211 $\mu\text{Sv/jam}$, sedangkan hasil simulasi sebesar 0,080–0,782 $\mu\text{Sv/jam}$. Berdasarkan Perka BAPETEN No. 8 Tahun 2013, seluruh hasil pengukuran dan simulasi tidak melebihi Pembatas Dosis dan Nilai Batas Dosis sesuai klasifikasi area. Hasil validasi menunjukkan persentase deviasi sebesar 0,5–682%, dengan lima titik memiliki deviasi $\leq 10,6\%$, sedangkan deviasi terbesar terdapat pada titik operator sebesar 682% yang dipengaruhi dengan perbedaan karakteristik material *lead glass* dan geometri model simulasi. Secara keseluruhan, simulasi *Monte Carlo* FLUKA mampu merepresentasikan distribusi laju paparan radiasi dengan tingkat kesesuaian yang baik pada sebagian besar titik pengukuran.

Kata kunci : CT Scan, FLUKA, proteksi radiasi, laju paparan radiasi, *Monte Carlo*, validasi.

ABSTRAK

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Study rogram : Physics
Title : Evaluation of FLUKA Monte Carlo Simulations against Radiation Exposure Rate Measurements in the CT Scan Room at RSUD Bandung Kiwari

The use of X-ray equipment in CT scan rooms poses a potential risk of radiation exposure to the surrounding environment, necessitating an evaluation of radiation protection effectiveness. This study aimed to determine and validate radiation exposure rate values through experimental measurements using a survey meter and FLUKA Monte Carlo simulations in the CT scan room at RSUD Bandung Kiwari. Experimental results showed exposure rates ranging from 0.078 to 0.211 $\mu\text{Sv/h}$, while simulation results ranged from 0.080 to 0.782 $\mu\text{Sv/h}$. In accordance with BAPETEN Regulation No. 8 of 2013, neither the measurement nor the simulation results exceeded the Dose Constraints or Dose Limits applicable to the respective area classifications. Validation results indicated percentage deviations ranging from 0.5% to 682%; five points showed deviations of $\leq 10.6\%$, whereas the largest deviation 682%—occurred at the operator position, a result influenced by differences in lead glass material characteristics and simulation model geometry. Overall, the FLUKA Monte Carlo simulation successfully represented the radiation exposure rate distribution with a good level of agreement at the majority of measurement points.

Keywords: CT Scan, FLUKA, radiation exposure rate, Monte Carlo, validation.