

ABSTRAK

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Jurusan : Fisika
Judul : Perhitungan Dosis Paparan Radiasi di Laboratorium Fisika Nuklir
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Simulasi

Penelitian ini bertujuan untuk mengukur dan memvalidasi sebaran dosis radiasi di Laboratorium Fisika Nuklir UIN Sunan Gunung Djati Bandung menggunakan surveymeter InSpector1000 dan simulasi FLUKA. Pengukuran dilakukan secara eksperimen di beberapa titik laboratorium dan disesuaikan dengan simulasi. Hasil eksperimen menunjukkan laju dosis di titik tembok $0.048 \mu\text{Sv/jam}$, depan pintu $0.043 \mu\text{Sv/jam}$, Laboratorium Geofisika $0.042 \mu\text{Sv/jam}$, dan Laboratorium Karakteristik Material $0.044 \mu\text{Sv/jam}$. Simulasi FLUKA menunjukkan kisaran dosis antara 0.000427 hingga $0.0724 \mu\text{Sv/jam}$, masih di bawah Nilai Batas Dosis (NBD) Perka BAPETEN No 4 Tahun 2013. Validasi menunjukkan kesalahan relatif di bawah 51% di samping tembok, 66% di depan pintu, 93% di Laboratorium Geofisika, dan 100% di Laboratorium Karakteristik Material, disebabkan oleh sebaran dosis yang tidak merata. Energi optimal radiasi gamma yang dipancarkan adalah 0.133 MeV .

Kata Kunci: Radiasi, Paparan Radiasi, Dosis, Radionuklida, Surveymeter, Simulasi, FLUKA, Eksperimen.

ABSTRACT

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Major : Physics

Title : Calculation of Radiation Exposure Dose at the Nuclear Physics Laboratory of Sunan Gunung Djati State Islamic University: Experiments and Simulations

This study aims to measure and validate the radiation dose distribution at the Nuclear Physics Laboratory UIN Sunan Gunung Djati Bandung using InSpector1000 surveymeter and FLUKA simulation. FLUKA simulation. Measurements were carried out experimentally at several points laboratory and adjusted to the simulation. The experimental results show that the dose rate at the point of the wall 0.048 $\mu\text{Sv}/\text{hour}$, in front of the door 0.043 $\mu\text{Sv}/\text{hour}$, Geophysical Laboratory 0.042 $\mu\text{Sv}/\text{hour}$, and in front of the door. Geophysics Laboratory 0.042 $\mu\text{Sv}/\text{hour}$, and Material Characteristics Laboratory 0.044 $\mu\text{Sv}/\text{hour}$. FLUKA simulation shows a dose range between 0.000427 to 0.0724 $\mu\text{Sv}/\text{hr}$, still below the Dose Limit Value (NBD) Perka BAPETEN No. 4 Year 2013. Validation showed relative errors below 51% next to the wall, 66% in front of the door, 93% in the Geophysics Laboratory, and 100% in the Material Characteristics Laboratory, due to the dose distribution of the Materials, caused by uneven dose distribution. Optimal energy of gamma radiation emitted is 0.133 MeV.

Keywords: Radiation, Radiation Exposure, Dose, Radionuclides, Surveymeter, Simulation, FLUKA, Experiment.