

A NEW TECHNIQUE FOR DISCRIMINATION OF INTERNAL AND EXTERNAL CONTAMINATION IN WHOLE-BODY COUNTING

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In whole-body counting, problems may arise when the subjects undergo external contamination. In many cases, especially after accidents, the contamination both of the skin and of the hair cannot be removed completely by the first decontamination treatment. Thus, for the first estimation of radioactivity intake the complex spectrum from internal and external contamination must be separated.

At the KfK a new technique for discrimination of internal and external contamination was developed. The technique is based on the analysis of photopeak asymmetries in the spectra of NaI (Tl) scintillation detectors. The photopeak asymmetry is caused by Compton scattering in the forward direction and thus giving information about the attenuation of the radiation. For description of the asymmetry a modified Gaussian fit can be used. This fit is based on four parameters for the photopeak, the fourth of which being related to the thickness and the absorption coefficient of the material between the radiation source and the detector.

The paper describes the application of the fit for the evaluation of whole-body counting spectra. The problems encountered by uniform external contamination and inhomogeneous internal contamination are discussed.