# NEUTRON/GAMMA DOSE SEPARATION BY THE MULTIPLE ION CHAMBER TECHNIQUE

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Mixed neutron/gamma radiation dosimetry is more complex and less well understood than gamma dosimetry. Fundamental disagreements still exist over neutron/gamma dose separation in phantom and in patients.

Many mixed n/(gamma) dosimetry systems rely on two dosimeters, one composed of a tissue-equivalent material and the other made from a non-hydrogeneous material. The paired chamber technique works well in fields of neutron radiation nearly identical in spectral composition to that in which the dosimeters were calibrated. However, this technique is drastically compromised in phantom due to the degradation of the neutron spectrum. The three-dosimeter technique allows for the fall-off in neutron sensitivity of the two-hydrogeneous dosimeters. Precise and physically meaningful results were obtained with this technique with a D-T source in air and in phantom and with simultaneous D-T neutrons and ('60)Co gamma ray irradiation in air.

The MORSE-CG coupled n/(gamma) three dimensional Monte Carlo code was employed to calculate neutron and gamma doses in a water phantom. Gamma doses calculated in phantom with this code were generally lower than corresponding ion chamber measurements. This can be explained by the departure of irradiation conditions from ideal narrow-beam geometry.