# Measurement of Spatial Distribution of Neutrons and Gamma Rays Using Imaging Plate for Biomedical Engineering

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**Abstract**

**Purpose:** Radiation irradiation is often used in biomedical engineering. Quality assurance of the spatial distributions of neutrons and gamma rays is desired. This study attempts to measure those distributions using imaging plates (IPs).

**Method:** The IPs used were BAS-TR by Fujifilm corporation. The converters used were 5 mm thick carbon for gamma rays, 4 mm thick polyethylene doped with 10 wt% 6Li for epithermal neutrons, and 1 mm thick polyethylene for fast neutrons. The IPs included in the converters were irradiated with the standard epithermal neutron irradiation mode in Kyoto University Reactor Heavy Water Neutron Irradiation Facility, at a power of 1 MW. For comparison, the distribution of epithermal neutrons were measured using Au foils combined with Cd covers. The distribution of gamma rays were measured with thermoluminescence dosimeters (TLDs).

**Results:** The distributions measured with IPs have plausible shape with peak at the center of the irradiation field. Those agrees with the measurements by Au foils and TLDs within 10-20%.

**Conclusion:** A trial to measure the spatial distribution of the neutrons dependent on their energy and gamma rays separately was demonstrated by using a commercially available IP combined with converters to enhance specific beam components. The results suggest that those spatial distribution can be measured with the proposed method.