

Development of dose standard for X-ray used in mammography

Aiming for more precise dosimetry in breast cancer examination

Reference field for mammography has been established using a molybdenum-anode X-ray tube and a molybdenum filter (Mo/Mo). The calibration coefficients of an ionization chamber obtained in the mammography reference field are compared with those in the conventional soft X-ray reference field which were produced using a tungsten-anode X-ray tube with aluminum filters (W/Al). The difference in the calibration coefficients between these reference fields was about 1 %. This development is expected to improve the precision of dosimetry for mammography.

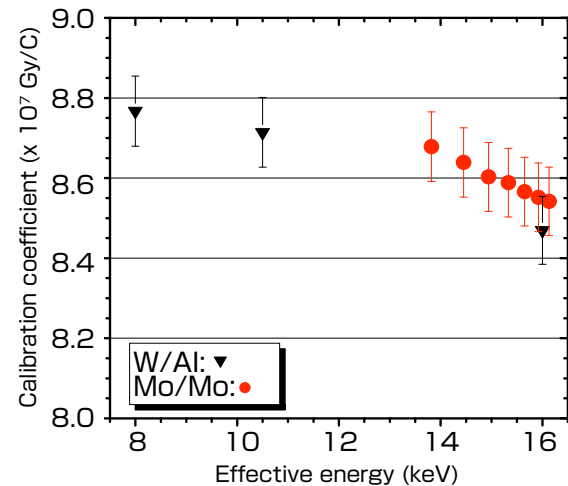
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Comparison of calibration coefficients between radiation qualities of W/Al (conventional) and Mo/Mo (mammography)



Study of a new microwave power standard

Microwave power standard based on frequency measurement

We are developing a new method for measuring microwave power based on frequency measurement. An atomic Rabi frequency is proportional to the microwave field strength. The microwave field strength is thus uniquely determined by the Rabi frequency. The new microwave power measurement using the Rabi frequency has the advantages over the present calorimeter system in terms of stability, time constant and ability for remote calibration. Furthermore, it is possible to check the consistency of microwave power unit derived from different methods (i.e. the Rabi frequency and the calorimetric methods).

The microwave magnetic field strength was measured using the Rabi frequency between microwave and gaseous cesium atoms in a glass cell. Transformation from the field strength into the absolute value of the power and comparison between the new microwave power measurement and the present standard will be performed in a later work.

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Microwave waveguide and cesium vapor cell
The cell was designed to fit in the waveguide.
The Rabi frequency was obtained in the waveguide.

