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Development of the High-resolution Scintillator Type Imager Using Si GRID structures

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The scintillator type X-ray image detector is being developed in this paper. The spatial resolution of this detector is not so higher than direct conversion type x-ray image detector because of scattering of luminescence of scintillator in the detector. The diffusion of light emit of scintillator by X-ray irradiated was suppressed by processing the silicon substrate using microfabrication technology. These small hole patterns were machined in a silicon substrate, and the scintillator was filled in the silicon grid holes. These holes reflect the light emitted by the scintillator and suppresses diffusion. The scintillator can be optically separated by this device. And these structures are operated as one detector. The purpose of this study is to prove that the silicon grid structures improve the spatial resolution of the scintillator type detector. Therefore, we measured the spatial resolution of the scintillator using this Si grid structures. In this study, CsI:Tl was buried in grid holes by the melting method. The spatial resolution of the sample in which CsI:Tl was deposited into the inside of the grid structure was measured. From this result, the deposition of the scintillator in the Si grid structures using the melting method has led to an improvement in spatial resolution of the scintillator type X-ray image detector.