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## Monte-Carlo Simulation Studies for the Performance Characteristics of Anti-Scatter Grids

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In medical image, the quality of image is most important, but X-ray that penetrated the patients produces the scatter radiation that makes the image to be blurred and reduces the contrast of image. Up to now, the anti-scatter grid has been widely used because very effective improvement of image contrast can be expected with the grid that designed and manufactured appropriately. The objectives of this study are the construction of the grid characteristic database in terms of grid design parameter and the optimization of the grid performance in the specific condition. MCNP code was used for Monte-Carlo studies. The X-ray spectrum data used for the input data of MCNP code was obtained from a computer program, IPEM report No.78. The beam quality check was performed for adjusting the X-ray spectrum generated in IPEM report No.78. The design factor of anti-scatter grid in this study was focusing distance, septa & interspace thickness and grid height. The simulation was performed for not only aluminum interspace grid but also carbon interspace grid which was recently introduced. The evaluation factor of grid performance in this study was the transmission of primary radiation( $T_p$ ), scattered radiation( $T_s$ ), and total radiation( $T_t$ ). The evaluation of anti-scatter grid was also performed in reality to confirm the accuracy of simulation data. In comparison result between simulation and real experiment, the relative error is 2.3% on the average and the maximum is 4.6%. In the case of  $T_p$ , the relative error is less than 1.7%, and in case of  $T_s$ , it is 4.9%. The evaluation method of grid characteristic with Monte-Carlo simulation reproduced the real experiment well. The carbon grid was of better performance than the aluminum grid, it was thought that the carbon grid could be widely used. We could choice the grid design variable that met the specific conditions using grid characteristic database.

Keywords : X-Ray, Anti-Scatter Grid, Monte-Carlo Simulation