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## **Characterization and MCNP simulation of Neutron Energy Spectrum shift after transmission through strong absorbing materials and its impact on tomography reconstruction image**

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An ideal neutron radiograph used for quantification and 3D image tomography reconstruction should be a transmission image, which exactly obeys the exponential law of attenuation with a monochromatic neutron beam. There are many reasons, why this assumption does not hold for high neutron absorbing materials. The main deviations from the ideal are due essentially to neutron beam hardening effect. The main challenges of this work are the characterization of neutron transmission through boron alloyed steel material and the study of beam hardening effect on neutron transmission tomography image appearance of a sample made essentially from this material. MCNP and FBP simulation were performed to adjust linear attenuation coefficients data and to perform 2D topographic image reconstruction with and without beam hardening corrections. A suitable beam hardening correction procedure was developed and applied. The results of 2D images reconstruction of original and corrected projections data obtained were qualitatively and quantitatively compared.

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