Stereographic images acquired with gamma rays and thermal neutron radiography

M. I. Silvani[1], G. L. de Almeida[1], R. Furieri[1], R. T. Lopes[2]
e-mail: msouza@ien.gov.br

[1] *Division of Nuclear Engineering - IEN*
[2] *COPPE-LIN - UFRJ*

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The inner structure of an object, which should not be submitted to an invasive assay, can only be perceived by using a suitable technique in order to render it *transparent*. A widely employed technique for this purpose involves the using of a radiation capable of passing through the object, collecting the transmitted radiation by a proper device, which furnishes a radiographic attenuation map of the object. This map, however, does not display the spatial distribution of the inner components of the object, but a convoluted view for each specific attitude of the object with regard to the set beam-detector. A 3D tomographic approach would show that distribution but it would demand a large number of projections requiring special equipment and software, not always available or affordable. In some circumstances however, a 3D tomography can be replaced by a stereographic view [1] of the object under inspection, as it was performed in this work, where instead of tens of radiographic projections, only two of them taken at suitable object attitudes are employed. Once acquired, these projections are properly processed and observed through a red & green eyeglass. For monochromatic images, this methodology requires the transformation of the black & white radiographs into red & white and green & white ones, which are afterwards merged to yield a single image [2]. All the process is carried out with the software *ImageJ*. In this work, the Argonauta reactor at the *Instituto de Engenharia Nuclear* in Rio de Janeiro has been used as a source of thermal neutrons to acquire the neutron radiographic images, as well as to produce ^{198}Au sources employed in the acquisition of gamma-ray radiographic ones. X-ray or neutron-sensitive imaging plates have been used as detector, which after exposure were developed by a reader using a 50µm-diameter laser beam.

References

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