

# ALGORITHM FOR BETTER X-RADIOGRAPHY ANALYSES\*

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## ABSTRACT

A long-standing problem in the characterization of multilayered ICF capsules is the determination of the position of surfaces and interfaces from x-radiographic images. The algorithm we developed in 1994 (as an addition to NIH Image to perform x-radiography analyses) used only three pixels in each direction to approximate radial profile values, while four in each direction would give a more accurate surface-fit. The algorithm was also susceptible to noise in second derivative radial profiles caused by interlaced imaging cameras and by finding the second derivative radial profile using the finite derivative ( $\Delta z/\Delta r$ ) of the radial surface-fit, instead of the infinitesimal derivative ( $dz/dr$ ). We have developed a new algorithm to speed up the calculations and solve these problems. The new algorithm uses a surface-fit equation based on 12 points surrounding the point to be approximated, giving 4 values in each direction and, thus, a more accurate and precise surface-fit. It also calculates the infinitesimal second derivative of the surface-fit equation directly, clearing up the unnecessary noise caused by the interlaced imaging cameras and the older algorithm's finite derivative approach.

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