

Abstract Submitted for the Forty-Seventh Annual  
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Category Number and Subject: 7.2.3. Target Fabrication

Theory     Experiment

**Measuring Dopant Concentration in Graded NIF Targets through Quantitative Contact X-Radiography,\*** H. Huang, R.B. Stephens, *GA*, J. Gunther, *LLNL* – Doping level must be known to 0.05 atomic percent and its radial distribution to one micron for graded targets used in NIF experiments. We have developed a quantitative contact x-radiography system (x-radiograph, film digitizer, and analysis software) that can meet those conditions. Traditional x-radiograph systems (either film- or scintillator-based) contain 1) spatial distortion errors and 2) opacity uncertainties that are unacceptable for this case. For the first, we designed a high precision digitization system with 0.5  $\mu\text{m}$  optical resolution and added a customized algorithm to remove the lens pincushion distortion and the CCD pixel size effect. For the second, we have developed a detailed film model to convert gray scale information into x-ray absorption strength under polychromatic radiation conditions. The model is calibrated on polypropylene flats and can measure the x-ray absorption (and thereby dopant level) to  $\sim 10\%$  in each sublayers. Our measurement results on Cu-doped Be shells and Ge-doped GDP shells agrees with those from destructive techniques.

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Oral     Poster