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Developing x-ray Fresnel Diffractive-Refractive Radiography for Measuring Mutual Diffusion in Warm Dense Matter[1] CAMERON ALLEN, MATTHEW OLIVER, THOMAS WHITE, University of Nevada, Reno, WOLFGANG THEOBALD, Laboratory for Laser Energetics, ALISON SAUNDERS, YUAN PING, OTTO LANDEN, LAURENT DIVOL, TILO DOEPPNER, Lawrence Livermore National Laboratory — The experimental measurement of concentration-driven diffusion between two species in warm dense matter (WDM) is important for modeling the structure of Jovian planets and for simulating instability growth in inertial confinement fusion (ICF) experiments. We are developing x-ray Fresnel diffractive-refractive radiography (FDR) for use at the NIF and the OMEGA laser facility, which combines ultra-small source size (1 μm slits) with a thin cylindrical sample (d <10 μm) that will be isochorically heated to ˜10 eV. Measurements are sensitive to Fresnel diffraction signatures, and can resolve density gradient changes with sub – 1 – μm resolution. We will discuss results from the first OMEGA experiments and experimental design plans for NIF experiments.

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