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Understanding 3D Asymmetries In X-ray Drive At The National Ignition Facility Using a Simple View Factor Metric[1] B. MACGOWAN, O. LANDEN, D. CASEY, C. YOUNG, P. MICHEL, D. CALLAHAN, J-M. DI NICOLA, D. MARISCAL, T. MA, J. MILOVICH, R. NORA, M. HOHENBERGER, P. PATEL, D. SCHLOSSBERG, A. MOORE, E. HARTOUNI, R. HATARIK, B. VAN WONTERGHEM, S. YANG, Lawrence Livermore Natl Lab, H. RINDERKNECHT, Laboratory for Laser Energetics — Low mode 3D drive asymmetries are an important degradation mechanism for NIF indirect drive implosions. We will apply a simple static view factor model to assess sources of drive variability at the capsule. The sources include laser performance variation in the foot and peak, errors in laser/target positioning, losses from target diagnostic windows, variation in Cross Beam Energy Transfer (CBET), and drive losses due to Stimulated Brillouin Scattering (SBS). Each source can produce mode-1 drive imbalances of M_1/M_0 ~0.5%. Combined the drive imbalances can impart a velocity of 100km/s to the imploded hotspot, degrading the yield. Mode-2 drive imbalances of P_2/P_0 ~0.5% that can lead to hotspot shape changes of P_2 ~5-μm from shot to shot, are also seen. We compare the view factor representation of the known drive asymmetries with measurements from the hotspot velocity and shape diagnostics, together with SBS observations, for multiple experiments with different ablators and target scales. These studies illuminate correlations and systematic trends in the facility performance and laser coupling including variability of CBET.

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