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KULL Simulations of OMEGA Radiation Flow Experiments[1] J. KALLMAN, S. MACLAREN, K. BAKER, P. AMALA, K. LEWIS, M. ZIKA, Lawrence Livermore National Laboratory — The problem of radiation flow in a right circular cylinder is of interest for the verification and validation of radiation codes, which utilize several mechanisms for determining radiation transport (diffusion, discrete ordinates, and Monte Carlo). This flow is analogous to free molecular flow in a similar geometry.[2] A series of experiments were conducted on the OMEGA laser in cases with a low-density heated cylindrical wall. The experiments consisted of a 1.6 mm diameter gold hohlraum containing an on-axis 700 μm diameter SiO_2 cylinder contained in an 80 μm thick carbon foam tube. Five shots panning three test cases were used: the nominal geometry described above (heated wall), the carbon tube replaced with solid gold, and a gold cap placed on the laser end of the cylinder assembly to block axial radiation flow. Simulations of each experimental target type were run with the KULL radiation code, and were used to compare the different radiation transport packages in KULL by employing synthetic diagnostics to match the experimental DANTE cavity radiation temperature time history and soft x-ray images taken by a streak camera imaging the far end of the hohlraum.

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[2]E. Garelis and T.E. Wainwright. Phys. Fluids. **16**, 4 (1973)

Joshua Kallman
Lawrence Livermore National Laboratory

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