**Enabling Scalable Radiation Modeling Through Adaptive Mesh Refinement**

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Radiative heat transfer is an important mechanism in a class of challenging engineering and research problems. A direct all-to-all treatment of these problems is prohibitively expensive on large core counts. Here, we show that radiation calculations can be made to scale within the Uintah framework through a novel combination of reverse Monte Carlo ray tracing techniques combined with adaptive mesh refinement. Strong scaling results from DOE Titan are shown to 256K cores and 16K GPUs.