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Numerical Study of Detonations in Multiphase Flows BENJAMIN J MUSICK, JACOB A MCFARLAND, Univ of Missouri - Columbia, PRASHANT TAREY, PRAVEEN K RAMAPRABHU, Univ of North Carolina Charlotte, DOUGLAS A SCHWER, Naval Research Laboratory Washington DC — The detonation phenomenon is of great interest in the engineering and scientific community. Much work has been done for gaseous detonations and their processes are relatively well understood. However, multidimensional, multiphase detonations develop characteristics that are more complicated to predict and understand. Many practical engineering applications aim to utilize liquid fuels due to their convenient nature, thus, a need arises for a greater understanding of liquid spray detonations. This poster focuses on the effects of varied initial conditions and physical models in two-dimensional liquid droplet JP-10 detonations. The effects of equivalence ratios, droplet size, droplet distribution, and particle breakup will be discussed. Different methods for particle tracking and generation will be discussed as well. Data was generated using the FLASH code developed by the Flash Center for Computational Science and modified for this work to include reactions and active particles using the particle-in-cell method. The multiphase results will be compared to data from gas phase simulations and other multiphase simulation codes.

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