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Modeling the Optimal Heat Transfer Fluidization Velocity in Gas-Fluidized Beds[1] THOMAS PREDEY, JON BOUGIE, ALEKSANDR GOLTSIKER, Loyola University Chicago — Fluidized beds are vital to a wide range of industrial applications and are useful for studying two-phase flow. However, modeling the optimal heat transfer fluidization velocity (OHTFV) in such beds has remained difficult. Previous investigations have commonly taken one of two approaches. One such approach attempts to find a general scaling formula for homogeneous fluidized beds by taking a harmonic average between the terminal and minimum fluidization velocities. Modern approaches using computer simulations and a wide range of parameters are more commonly used in industry today, but are generally concerned with specific applications. We propose a third approach, taking into account the inhomogeneity of the fluidized bed system while limiting the input parameters to gas velocity and particle size. We use this approach to find a general formula for OHTFV that accounts for the collective behavior of the particles rather than focusing on each individual particle in the bed. We then compare this model to previous experimental results.

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