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**Isothermal Expansion of a Solid-Particle-Entrained Gas and Plasma-Based Energy Conversion** ERIC LESSMANN, MATTHEW TRAUM, DUNCAN WEATHERS, CARLOS ORDONEZ — Experimental and theoretical research is reported on the expansion of a two-phase fluid consisting of a mixture of compressed gas and solid particles. Experimental temperature measurements indicate that the expansion is describable as isothermal for the conditions studied. During the expansion, the energy of the compressed gas is converted into kinetic energy of the solid particles. The solid particles travel at a subsonic speed, serve as a heat exchange medium, and are recycled. In the experiment, the gas-solid two-phase fluid travels through a nozzle during the isothermal expansion. Conversion of the energy of a compressed gas has been demonstrated experimentally using a turbine to convert the kinetic energy of the solid particles into other forms. A second method is also being studied for converting the kinetic energy of the solid particles after the gas expansion. The second method, which would replace the turbine, would convert the kinetic energy of the solid particles into electrical energy by charging the solid particles (e.g., by passing them through an electron plasma or by reflection off one plate of a capacitor). The charged solid particles would then carry a current across a change in electric potential inertially (without collisions with a wall) and then be discharged (e.g., by passing them through an ion plasma or by reflection off one plate of a second capacitor).

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