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Heat Transport Effects in Rotating Gases and Plasmas[1] ELIJAH KOLMES, VASILY GEYKO, NATHANIEL FISCH, Princeton Univ — In some contexts, rotating gases and plasmas exhibit heat transport effects that are substantially different from what would be found in the absence of rotation. For instance, a Ranque-Hilsch vortex tube is a device which separates an input stream of (neutral) gas into hot and cold streams by setting up a rotating flow in a specially designed cylindrical chamber. One class of vortex tube models involves radial motion that carries gas up and down the pressure gradients set up by the centrifugal potential inside the tube and which results in adiabatic heating and cooling of the radially moving material. The approach of producing heat transport in a rotating flow using pressure gradients and motion along those gradients may have applications in plasma systems. We discuss possible applications for rotational heat transport effects in plasma systems, including Z-pinch configurations.

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