

Abstract Submitted  
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**Temperature gradient formation while axial gas compression**<sup>1</sup> V.I. GEYKO, N.J. FISCH, Princeton University — A spinning gas in equilibrium has a rotation-dependent heat capacity [1]. However, as equilibrium is approached, such as after sudden heating, significant variations in temperature appear. Surprisingly, when fast axial compression or instantaneous gas heating occurs, the temperature does not grow homogeneously in radial direction, but instead has a gradient towards to the maximum of potential energy of external or self potential. The gradient monotonically grows with compression rate and the amplitude of the potential. The gradient builds up due to change of equilibrium density distribution, yet, not due to acoustic waves created by the compression. This result was checked in numerical simulations for particles in an external constant gravitational potential and also for rotating gas in the cylinder with perfect slip boundary conditions on the walls.

[1] V.I Geyko and N.J. Fisch, Phys. Rev. Lett. **110**, 150604 (2013).

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