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**Bi-flow distribution in a gas of hard spheres with modes of the “accelerating-packing” type.**  
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**Summary:** We constructed explicit approximate solutions of the Boltzmann equation for the hard-sphere model, which have the form of bimodal distribution, i.e., linear combination of nonstationary inhomogeneous Maxwellians. They describe the interaction of two gas flows, which are accelerated and packed when moving along a fixed axis. Sufficient conditions for the minimization of the integral error between the sides of the Boltzmann equation are found.

**MSC:**

- 76P05** Rarefied gas flows, Boltzmann equation in fluid mechanics
- 45K05** Integro-partial differential equations
- 82C40** Kinetic theory of gases in time-dependent statistical mechanics
- 35Q55** NLS equations (nonlinear Schrödinger equations)

**Keywords:**

Boltzmann equation; hard spheres; Maxwellian; approximate solution; bimodal distribution