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Numerical Study of Flow Structure of the Taconis Oscillations in an Axisymmetric Closed Tube KATSUYA ISHII, ITC, Nagoya Univ., SHYUN KITAGAWA, CSE, Nagoya Univ., SHIZUKO ADACHI, Tokyo International Univ.
— Spontaneous thermoacoustic oscillations of a helium gas in a closed cylindrical tube are studied by solving the axisymmetric compressible Navier-Stokes equations. The wall temperature of the hot part near both ends (300K) and that of the cold central part (20K) are fixed. The computations are done for various values of the length ratio of the hot part to the cold part between 0.3 and 1.0. The oscillation states are divided into three groups according to the magnitude of the pressure amplitude, which are the fundamental mode and the second mode of a standing wave, and the oscillation with a shock wave. The states in each group have distinguished features of the vortical flow field. We analyze the effect of vortices on the structure of the temperature distribution and the flow of energy fluxes to gain a better understanding of the mechanism of the thermoacoustic oscillations.

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