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Cutoff frequency of sound velocities for a multi-slab Bose-Einstein condensate[1] O.A. RODRÍGUEZ, Posgrado en Ciencias Fisicas, UNAM, M.A. SOLÍS, Instituto de Fisica, UNAM — An inhomogeneous multi-slab 3D Bose gas is produced by applying to the gas a Kronig-Penney potential in one direction, while the bosons are free to move in the other two directions. The variable density produces a dispersive effect over the sound waves, making the phase and group sound velocities frequency dependent. Below the critical temperature the dispersion relation between wavenumber and frequency $\omega(k)$ is determined by a constant factor called *the curvature* of the density, within the Klein-Gordon equation which describes the sound wave propagation in the condensate. Since the curvature of the density profiles between and inside the barriers are completely different, the sound velocities are distinct too. More importantly, in the region occupied by the slabs waves propagate only if their frequencies are greater than a *cutoff frequency*, otherwise evanescent waves arise. We show the density profile, the phase and group sound velocities and we give the curvature dependent cutoff frequency as obtained from the group velocity equation for the region occupied by the barriers. For high frequencies both phase and group velocities approach to that of a homogeneous gas at the same temperature.

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