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The speed of sound in a Bose-Einstein condensate in optical lattices BIAO WU, ZHAOXIN LIANG, Institute of Physics, Chinese Academy of Sciences, Beijing, China, XI DONG, Department of Physics, Tsinghua University, Beijing, China — We have studied the speed of sound of a Bose-Einstein condensate in optical lattices both analytically and numerically. We find that in the one-dimensional case, the speed of sound falls monotonically with increasing lattice strength. However, the trends are different in two and three dimensional cases. In these two cases, when the interaction is strong, the speed of sound also decreases monotonically with increasing lattice strength. But when the interaction is weak, the sound speed first increases then decreases when the lattice strengh increases.

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