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Edge states of mechanical diamond[1] YUTA TAKAHASHI, University of Tsukuba, TOSHIKAZE KARIYADO, NIMS, YASUHIRO HATSUGAI, University of Tsukuba — Bulk-edge correspondence, a basic principle in topological phases, emerges not only in quantum mechanics but also in classical mechanics. A typical example is mechanical graphene, a spring-mass model with the honeycomb lattice[2]. Frequency dispersion of mechanical graphene shows creation and annihilation of Dirac cones with varying the uniform tension of the system. Localized edge modes arise with boundaries as in the case of graphene[3].
We generalize its discussion to three-dimensional diamond lattice, dubbed as mechanical diamond. Instead of Dirac cones, line nodes appear due to the chiral symmetry. Moreover, explicit multiple localized zero modes exist with boundaries in some regions of projected two-dimensional Brillouin zone. We discuss the topological nature of localized modes in terms of Zak phase and winding number[4].

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[2]T. Kariyado and Y. Hatsugai, Sci. Rep. **5**, 18107 (2015).
[3]S. Ryu and Y. Hatsugai, Phys. Rev. Lett. **89**, 077002 (2002).
[4]Y. Takahashi, T. Kariyado and Y. Hatsugai, in preparation.

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