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Moving excitations in a cation lattice

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Mica muscovite has a very special characteristic, its recording capability. Tracks from particles as muons can be distinguished in the complex decoration, but the only explanation to most of the tracks is localized excitations, called quodons [1]. They move in the cation layer without mass transport along the lattice directions. In a recent experiment an alpha particle has been sent to one side of a muscovite specimen and it has observed the ejection of atoms at the other side of the layer along a lattice line [2].
What makes the two dimensional, hexagonal lattice that form the cation layer so special? We advance the hypothesis that one reason is because it is made out of repulsive cations, potassium ions in muscovite. As a first step to explore the consequence of the hypothesis we study a one-dimensional model of potassium ions and observe that supersonic kinks [3] with a very different range of energies can propagate long distances riding a sea of phonons and crossing with others.

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