# Atoms vibrating in a twisted crystal spin waves that carry heat

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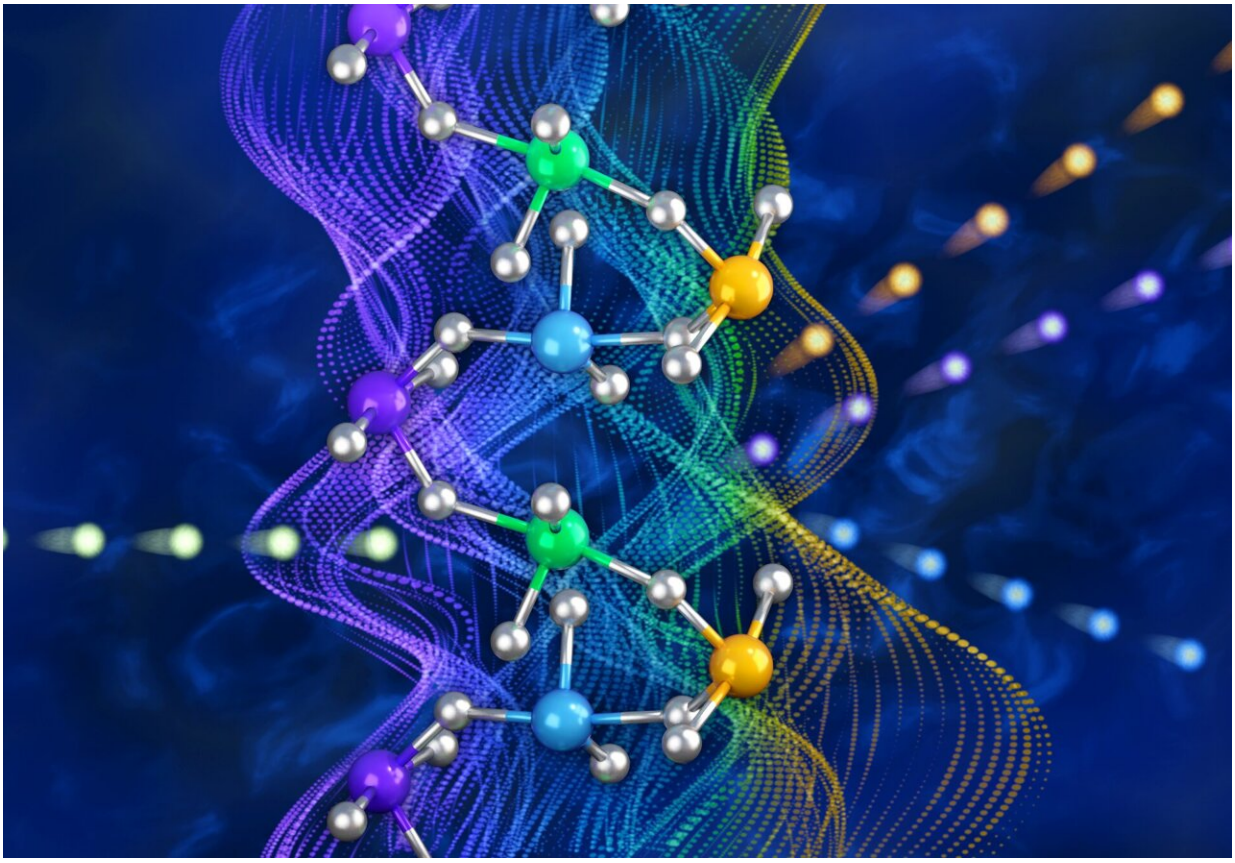

ORNL researchers observed that atomic vibrations in a twisted crystal result in winding energetic waves that govern heat transport, a discovery that may help new materials better manage heat. Credit: Jill Hemman/ORNL, U.S. Dept. of Energy

A discovery by Oak Ridge National Laboratory researchers may aid the design of materials that better manage heat. The team observed that atoms vibrating in a twisted crystal drive winding energetic waves that carry heat, like a corkscrew drives a cork from a bottle.

"The structural helix puts a spin on the waves," said ORNL's Raphael Hermann. He and his colleagues used neutron scattering to observe wave behavior inside a twisted crystal. Then, ORNL's Lucas Lindsay wrote rules for the wave behavior—that is, angular momentum conservation—into a model that ORNL's Rinkle Juneja has since applied to more than a dozen materials.

"New understanding of twisted systems helps us determine how heat moves in them," Lindsay said. "Using this knowledge, we are now searching for materials that better carry heat away in microelectronics or block heat, like in a thermos, to keep your coffee hot or your beer cold."

**More information:** R. Juneja et al, Quasiparticle twist dynamics in non-symmorphic materials, *Materials Today Physics* (2021). DOI: 10.1016/j.mtphys.2021.100548

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