Uncovering the secret behind the behavior of unique superconducting materials

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Researchers modeled the complicated interactions between negatively charged electron particles in a material and the interactions between electrons and phonons. Phonons are the smallest units of vibrational energy in a material. These models involved millions of particle states, with each state comprising distinct characteristics. The result is one of the team's largest calculations to date of copper-based superconductors. The method gives the researchers a framework to study the so-called "self-energy" of electrons. The results could help the team get closer to understanding the mechanisms of a unique family of copper-based superconductors, which would be more efficient than typical copper-based superconductors.

The study is published in Physical Review Letters.


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