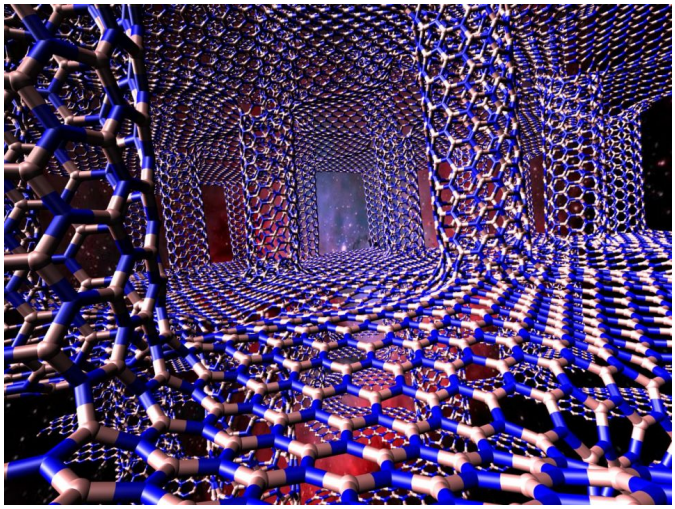
Graphene might be the wonder material the future, being ideal for both super-fast processors and batteries, and now a team at Rice University finds another application for the stuff-- the cooling of small electronics.



The cooling properties involve a "3D" variant of the material, dubbed "white graphene" (or hexagonal boron nitride, aka h-BN). White graphene appears to be a good heat conductor, and researchers say it can be used to move heat away from devices quickly and efficiently.

So far, the conductive properties have been tested through simulations of 3D white graphene planes connected by boron nitride nanotubes. These structures can move heat in all directions, beating the thermal limitations of regular graphene (where heat can move along the surface, but not through its multiple layers).

"This type of 3D thermal management system can open up opportunities for thermal switches, or thermal rectifiers, where the heat flowing in one direction can be different than the reverse direction," researcher Rouzbeh Shahsavari says. "This can be done by changing the shape of the material, or changing its mass-- say one side is heavier than the other-- to create a switch. The heat would always prefer to go one way, but in the reverse direction it would be slower."

In other words, the research might lead to smaller, more efficient device cooling solutions-- leading to even smaller and more powerful devices. The next step, of course, is to actually build said coolings solutions in the real world.

Go Dimensional Crossover of Thermal Transport in Hybrid Boron Nitride Nanostructures