



# RESEARCH2REALITY

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## The New World of Superconductors

An interview with Professor Andrea Damascelli  
Quantum Physicist, University of British Columbia

### What are quantum materials?

We are used to using many materials for applications, and a large number of applications have to do with electronic properties. And what we are used to seeing are metals and semiconductors, which often we still describe in terms of what is classical physics: motion of a charge from one location to another. When we talk about quantum materials, what we mean are properties which are intrinsically quantum mechanical, and they are so on a macroscopic scale. One such property is superconductivity; another one can be magnetism. So when we talk about quantum materials, we mean materials that really exhibit all these properties at a macroscale, and in such a way that we can actually use them for applications. One such application is, for instance, is magnetic levitation – levitating trains or MRI – magnetic imaging technology which is based on superconductors.

### What's new in your research?

We have, for instance, been working on using graphene, which is a famous single layer of carbon atoms whose discovery led to the awarding of a Nobel Prize a few years ago. And we're now trying to turn this system, which is a good conductor and a very strong material – stronger than steel – into a superconductor. And we have just, most likely, succeeded in doing so a few weeks ago.

### What are the potential results of your research?

Understanding nature, understanding the fundamental laws that govern certain phenomena. In this way, you can think in terms of our final goal being applications. But of course a large and very important aspect of this work is communicating and transferring this knowledge, so development of knowledge and transferring knowledge. And certainly my work, which is more fundamental than applied, this plays a major role