

The well-known and the unexpected

Lucia Reining,

CNRS, France

Using, processing and making new materials is one of the cornerstones of our well-being. Equipped with the periodic table and knowing the Coulomb interaction between the particles that make up the pieces of matter, we might think that the field is ready to be definitively handed over to engineers. But what a mistake this would be, how many opportunities we would miss!

Properties of materials are based on quantum many body physics. We may say that this is the science trying to understand, and to predict, how combining the many possible stories of an uncountable number of constituents may result into unforeseen turns in the global tale. The periodic table and the Coulomb interaction alone give us the pen and the paper with which the novel is written, but no clue yet of what the result will be.

In this talk we will discuss how we, starting from well-known fundamental scientific laws, are hunting for something that is not yet known, and not even expected nor expectable. How we are forced to change our point of view, and how this may impact our vision for the future.