

## SCIENCE AND CARD-TRICKS

**Thierry Giamarchi** – In my case, I enjoy doing science and I enjoy doing magic tricks very much – the two might seem different but in fact when you consider both communities, they are really close, first both are completely magical, in the sense that science performs absolutely incredible tricks, you'll see superconductors levitating above magnetic fields, and very often the tricks it does are far more spectacular than anything magicians are able to do; I think people hardly realize what magic there is behind the electronic equipment they have between their hands, such as a mobile phone or some similar object; and the second aspect, in fact, is the process of understanding what is going on, it is the same thing in science and in magic, first you marvel at the trick, you marvel at the physical phenomenon, and then you want to understand how things work, and the approach of a scientist, at that point, is exactly that of a spectator who can see the trick but is not allowed to know how the trick works, in other words the spectator can see it performed again and again, can lean an inch to the right or to the left or even sit behind the magician, with a bit of luck, but there are limits, there are things allowed and others that are not, exactly as a physics experiment there are things you can do and things you can't, you can develop instruments, you can use binoculars to take a closer peek as at a magic show, sometimes it will help understand, sometimes it won't.

In other words if you want to know what's going on inside matter, you've no choice but to develop the instrument to go see, which isn't always easy ! You have to make do with what you have .... It is the same when you do an experiment, in condensed matter physics, you can cool down up to a point, sometimes you would like to decrease the temperature tenfold and you simply can't ! So it is a bit like a magic show, you would love to walk on stage and lay hands on that box over there but you can't, you're not allowed to .... Which means you must try and understand without crossing the lines .... In magic, of course, the line is clearly drawn by the magician, usually .... In science, very often the limit is technological or it is your own fear to do the right experiment.... Or your lack of imagination for doing so ... Another difference is that of course in magic the magician is trying to fool, quote unquote, the audience, or rather, very often, to misdirect the audience, so that they won't see the important trick. In science, you might think, on the face of it, that you can see everything there's to see, but obviously there are so many phenomena going on at the same time that your attention is often diverted by one of them and you don't realize that what's important is that little something that's happening backstage. That is one of the difficulties, it is to be able to sort out, in a physical effect, what really matters from what is just smoke and mirrors Nature is pulling in front of you so that you'll miss the true mechanism behind... In a way, in magic, it is the other way round, you're on Nature's side, if you like, to some extent it is the sleight-of-hand artist who plays the part Nature plays in science, so that it is funny to be on both sides of the barrier.... And what's more, it's, it's beautiful, and it's easy to pack along, perhaps easier than a musical instrument.... So that I like to have both handy ....

**3min 22sec**