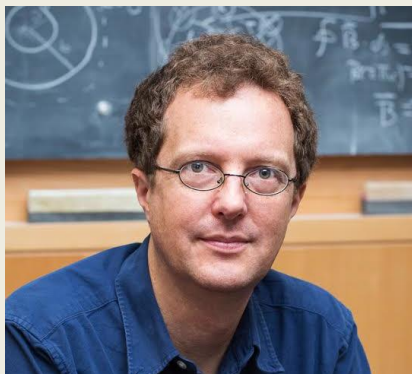
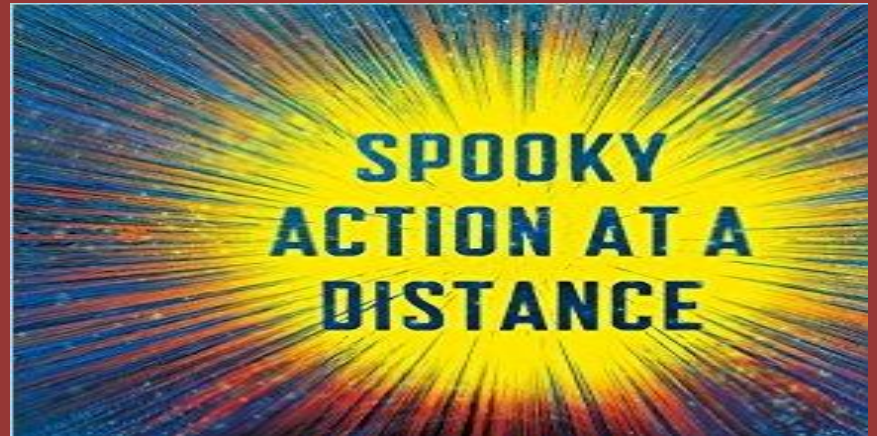


Non-locality and the Unification of Physics



George Musser is a contributing editor at Scientific American and Nautilus magazines and the author of Spooky Action at a Distance (2015) and The Complete Idiot's Guide to String Theory (2008). He has won numerous awards for his writing, including the 2011 Science Writing Award from the American Institute of Physics and 2010 Jonathan Eberhart Planetary Sciences Journalism Award from the American Astronomical Society, and was a Knight Science Journalism Fellow at MIT for 2014–2015. As Scientific American's senior editor for space science and fundamental physics for 14 years, he was co-awarded the U.S. National Magazine Award in 2003 and 2011.

Einstein famously worried about “spooky action at a distance”: the non-locality of quantum mechanics, whereby two particles remain synchronized no matter how far apart they are, as if each has lost its individual identity. Since his time, other instances of non-locality have emerged in quantum field theory, general relativity, and candidate quantum theories of gravity. Although all these frameworks are still local in the sense that causal influences cannot travel faster than light, they imply that physical structures cannot be localized and that a kind of holism operates in physics. Usually non-locality is presented as an inexplicable mystery, but the outlines of a rational explanation have begun to appear. Space-time may not be the ultimate venue of physics. Competing approaches to quantum gravity such as string theory and loop quantum gravity, for all their differences, agree that classical space-time derives from deeper physics and may be just one phase of an underlying system. The concept of emergent space-time, hazy though it still is, suggests explanations for a wide range of problems in physics and cosmology.

Thursday – February 16, 2017 at 4 p.m.

Main Lecture Theatre (AG-66), TIFR

1-Homi Bhabha Road, Colaba, Mumbai 400005