

Superconducting Magnets: an enabling technology for physics research and for society

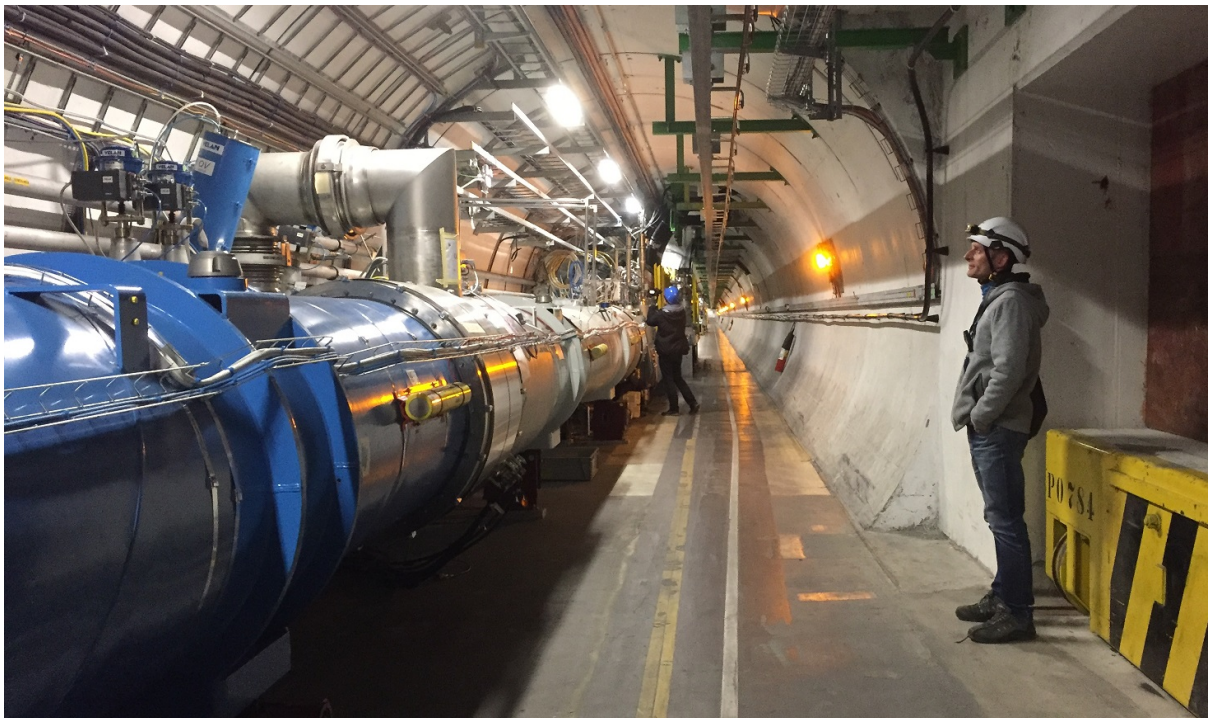
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Abstract:

Fundamental science has nurtured superconducting magnet technology for long, to explore the high energy particle regime. The discovery of the long-awaited Higgs boson at the CERN's LHC collider, based on thousands of powerful superconducting magnets, is maybe the most appalling outcome. However, much influential on our daily life is also the magnetic resonance imaging (MRI), made possible by large superconducting magnets. The quest for even higher magnetic fields, necessary for the next generation energy frontier colliders, is generating a vigorous effort toward the 20 tesla dipole field frontier (doubling the LHC range). New materials are being engineered, like rare earth- and/or iron-based superconductors and new paradigm for coil technology are under test, e.g., conductor windings with no electrical insulation. In the meanwhile, magnet designers are exploring new magnet topology to take advantage of new superconductors and new technologies. The talk will illustrate the recent achievement in this domain and discuss the possible reverberation on society.