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## Crystal Ball : On the Future High Energy Colliders

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Particle colliders for high-energy physics have been in the forefront of scientific discoveries for more than half a century. The accelerator technology of the colliders has progressed immensely, while the beam energy, luminosity, facility size, and cost have grown by several orders of magnitude. The method of colliding beams has not fully exhausted its potential but has slowed down considerably in its progress. I will briefly review known costs for 17 large accelerators based on traditional technologies (RF, magnets, etc), and examine feasibility of near- or medium-term collider projects that are currently subjects of design work or under active discussions. I will conclude with an attempt to look beyond the current horizon and to find what paradigm changes are necessary for breakthroughs in the field, and describe some R&D programs at FNAL which prepare for the long-term future, e.g. studies with crystals and the IOTA ring research.

### additional information

useful references:

Vladimir D Shiltsev High-energy particle colliders: past 20 years, next 20 years, and beyond (2012) Phys.-Usp. 55 965

Vladimir Shiltsev A phenomenological cost model for high energy particle accelerators (2014) JINST 9 T07002

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