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A Possible Future Use of the LHC Tunnel

The FCC program at CERN provides an attractive all-in-one solution to address many of the key questions in particle physics. While we fully support the efforts towards this ambitious path, we believe that it is important to prepare a mitigation strategy in case the program faces unexpected obstacles for geopolitical or other reasons. This approach could be based on two components: I) a circular electron-positron collider in the LHC tunnel that operates at the Z-pole energy of 45.6 GeV and II) a high-energy electron-positron linear collider which acts as a Higgs, top quark and W-boson factory, and that can further be extended to TeV energies. The former could reach a high luminosity that is not accessible at a linear collider, the latter could probe the high energy regime with higher sensitivity and discovery potential than LEP3. The program should be flanked by dedicated intensity frontier searches at lower energies. These accelerators can be used in a feasible, timely and cost-efficient way to search for new physics and make precise determination of the parameters of the Standard Model.

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