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New Suberconducting Technology to Enable the Next Generation of High Energy Research PETER MCINTYRE, Texas A&M University — Two innovations in superconducting technology have the potential to shape the future capabilities for discovery in high energy physics. First, a hybrid dipole has been devised that would utilize windings of the high-temperature superconductor Bi-2212 and the low-temperature superconductor Nb_3Sn to produce a field strength of 25 Tesla. The dipole would be suitable to replace the magnet ring in CERN's LHC, and would triple its collision energy in proton-proton colliding beams. Second, a polyhedral cavity has been devised for the high-gradient accelerating structure of an electron-positron linac collider. The polyhedral geometry provides access to the crucial inner surface during all stages of fabrication, and opens the possibility to prepare a heterostructure there that could support rf fields beyond the BCS limit. It also naturally suppresses deflecting modes so that the overall energy efficiency could be significantly improved. These features lead to a possibility for making high-luminosity e+e- collisions at TeV energy.

Peter McIntyre
Texas A&M University

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