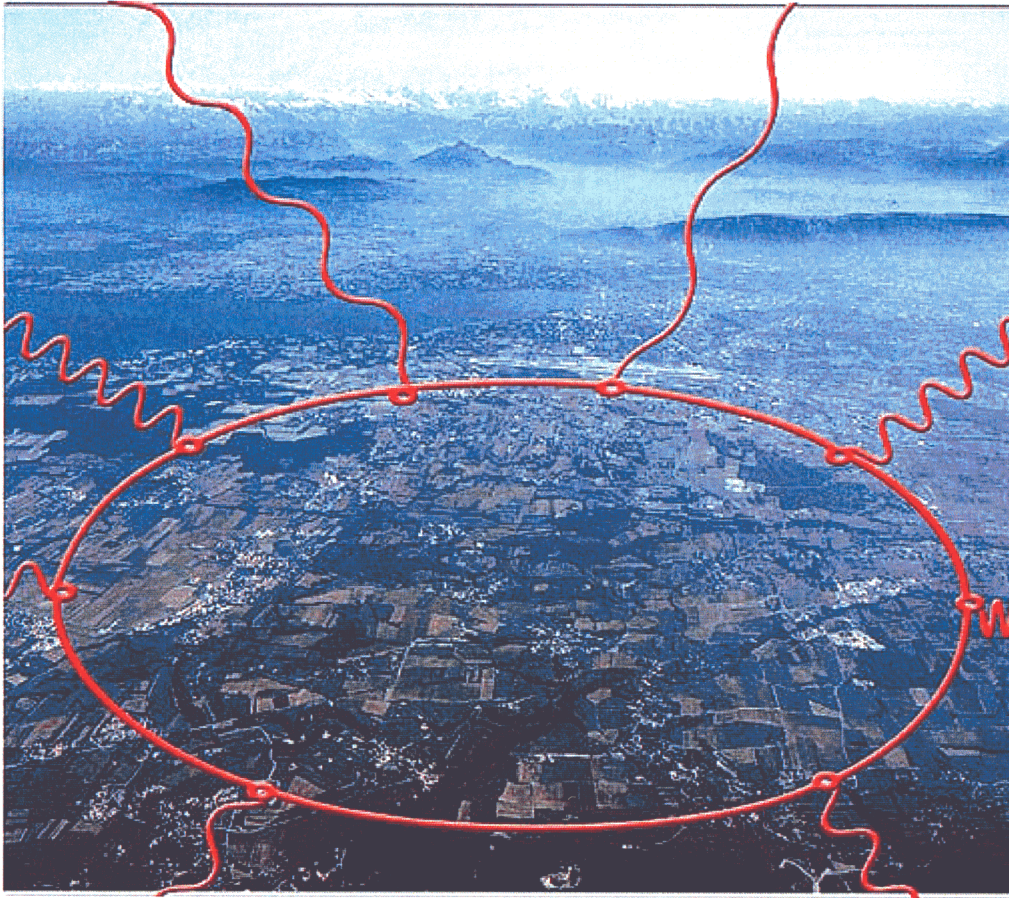


LHC Stretching Exercises



We are all eager to have data from LHC that will point to how the electroweak symmetry is broken, hopefully confirm that superpartners exist, or more generally provide signals of physics beyond the Standard Model that can focus our attention and give us clues to the underlying theory. Once there is a discovery there will be celebrations and champagne. Then what? Experimenters report cross sections times decay branching ratios, and some kinematical distributions that are related to masses, but seldom determine masses explicitly. Are these data sufficient to give us hints of the theory behind? Say we will learn that the cross section for events with energetic opposite sign leptons plus missing energy above 100 GeV is 53 fb, and several related kinds of “data”. In practice it may not be possible to measure any superpartner masses even if they exist. How do we figure out the physics implications of the data, how supersymmetry is broken, whether there is evidence for the 4D physics being determined by string theory, etc?

At the beginning of the meeting Gordy Kane will present some “data” that experimenters might report at a conference some months after LHC turnon, assuming nature is described by a particular string vacuum. While lots of real world complexities such as Standard Model backgrounds that could fake signals and systematic errors will be ignored, in principle the information provided will allow someone to deduce a great deal about the underlying theory and how supersymmetry is broken. (Note that we are providing major clues for this challenge already since in the real world it still needs to be established that low scale supersymmetry exists and that it is realized via string theory.) Everyone is encouraged to figure it out just as they will for LHC. At the end of the meeting the answer for this exercise will be provided, and a little description of how one would approach the problem.