The Higgs Boson in the Di-Photon Decay Channel

A major milestone for the first run of the Large Hadron Collider was the discovery of the Higgs boson where the Higgs decay to photons has been crucial for the discovery period. The measurement of the two photons seems deceptively simple: well measured photon energies and the correct opening angle. However, the pileup and the large probability of photon conversions in the tracker motivate the need for innovative techniques like Multivariate analyzers to optimize the Higgs search and bring the analysis closer to discovery. This talk will emphasize the MVA techniques which improve the photon energy measurement, the diphoton event classification, and also the identification of additional conversion tracks. Many innovative ideas have carried over to improve the photon and electron reconstruction and identification for the next Run of the LHC.