Measurement of Photon + Z to b-bbar at CDF

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ABSTRACT

In this study, we measure the production of Z boson + photon events in which Z decays to b-bbar, using photon + SVT trigger data and selecting for events with at least two-tagged b-jets and a real photon. We consider signal events with dijet mass consistent with the mass of Z (90 Gev). A set of kinematic cuts was applied to remove background events in which b-bbar results from a process other than Z decay. Additionally, we trained a neural network using MC to develop a variable that distinguishes between signal and background events in data. We studied the silicon vertex tracker (SVT) trigger efficiency in data and found efficiency as a function of b-jet t E_T. This relationship was then applied to Monte Carlo events as a weight so that Monte Carlo would model data more accurately. We generated cross sections for signal and background processes from the Monte Carlo and calculated a predicted number of signal and background events in the data, assuming 6600 pb^{-1} of luminosity. Signal predictions fall within the error on our measurements of signal fractions in the data, provided by chi-square minimizer TMinuit. For Monte Carlo events with kinematic cuts on photon $E_T > 20$ GeV, leading b-jet $E_T > 25$ GeV, and secondary b-jet $E_T > 20$ GeV, we predicted 16 signal events while our measurement on data resulted in 54 ± 40 signal events. Future studies would require the generation of significantly more Monte Carlo events in order to reduce the large statistical error on the signal fraction calculations.