LEPTONIC ANGULAR ACCEPTANCES

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This report presents the geometric acceptances versus minimum angle for leptons from a few basic SSC physics channels. It is intended to provide a quick guide to the effect of varying the electron or muon angular coverage. We have concentrated on leptonic decays of vector bosons: standard W's and Z's from either the continuum or from Higg's decay and new, heavier Z^0's.

The leptonic angular distributions were determined using either ISAJET 5.20 (single W,Z; continuum W- and Z-pairs; new heavy $SU(2)_L$ Z's and W's), PYTHIA46 (continuum Z-pairs; Higgs to Z-pairs) and from distributions provided by J. Rosner[1] (new U(1) Z_χ's). Geometric acceptances were than determined for different minimum angles. These were found with no cuts imposed, with a minimum p_t of 25 GeV/c due to electron trigger and identification requirements, and with the lepton momentum required to be less than 1000 GeV where the muon momentum resolution begins to be large.

Figure 1 gives the single lepton acceptance for $W \to l\nu$ from continuum W-pair events for p_{tW}'s of 100, 300 and 500 GeV/c. The results for single W^+ and W^- production differ from this (and from each other) but their averages are within 10%. Figure 2 repeats this, except now the 2-lepton acceptance from both W's decaying to $l\nu$ is determined. Figures 3 and 4 give the acceptances for leptonic decays of continuum Z-pair events for the p_{tZ}'s of 100, 300 and 500 GeV/c, with figure 3 giving the 2-lepton acceptances for one of the Z's decaying and then the 4-lepton acceptances from $ZZ \to llll$ being shown in figure 4. These Z-pair acceptances were determined using ISAJET with the PYTHIA results being essentially the same. Next, the same 2-lepton and 4-lepton acceptances for Z-pairs from decays of Higgs with masses of 300 and 800 GeV are given in figures 5 and 6.

Figure 7 gives the 2-lepton acceptance for $Z_\chi \to ll$ for Z masses of 500, 1000 and 2000 GeV. Shown are the angular acceptances with no requirements, with one lepton having $p_l < 1000$ GeV/c, and with both leptons being less than 1000 GeV/c. A $p_{tl} < 25$ GeV/c requirement had no effect. These acceptances were identical to those of a 'standard' Z of the same mass. Figure 8 gives the acceptances for either lepton from a heavy Z passing the angle and momentum cuts. Finally, in figure 9, the single lepton acceptances from a '$W' \to l\nu$ are shown for W masses of 500, 1000 and 2000.

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1. P. Langaker, R.W. Robinett, J.L. Rosner, Phys. Rev. D **30**, 1470 (1984). The Z_χ's were generated using Eichten structure functions with no intrinsic p_t or radiation.

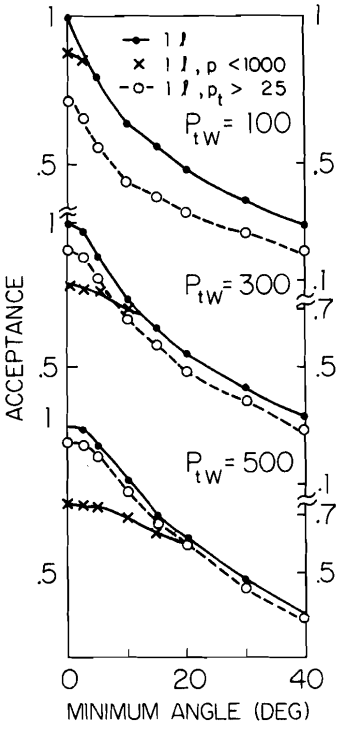

Fig. 1: Single lepton angular acceptance for $W \to l\nu$ from continuum W-pair events for p_{tW}'s of 100, 300 and 500 GeV/c.

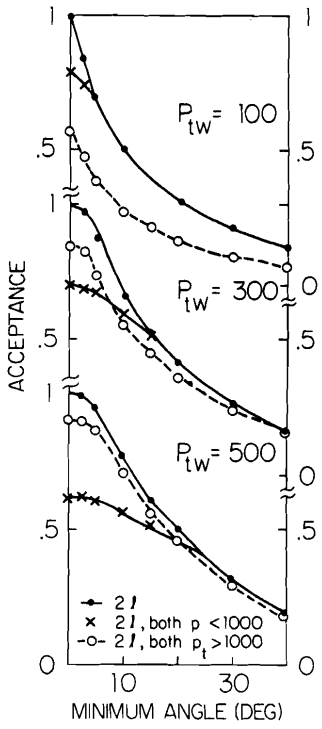

Fig. 2: Two-lepton angular acceptance for both W's decaying to $l\nu$ from continuum W-pair events for p_{tW}'s of 100, 300 and 500 GeV/c.

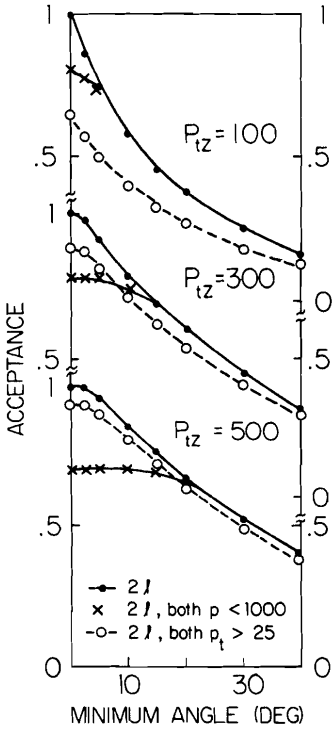

Fig. 3: Two-lepton angular acceptance for $Z \rightarrow ll$ from continuum Z-pair events for p_{tZ}'s of 100, 300 and 500 GeV/c.

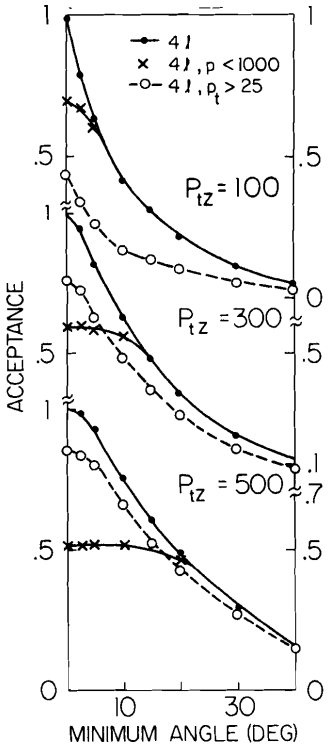

Fig. 4: Four-lepton angular acceptance for $ZZ \rightarrow llll$ from continuum Z-pair events for p_{tZ}'s of 100, 300 and 500 GeV/c.

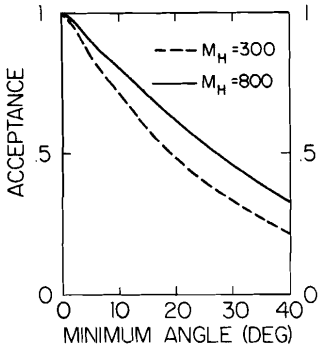

Fig. 5: Two-lepton angular acceptance for $Z \rightarrow ll$ from $H^o \rightarrow ZZ$ events with Higgs masses of 300 and 800 GeV.

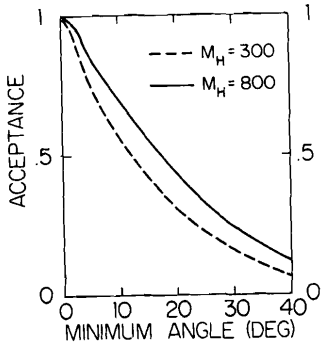

Fig. 6: Four-lepton angular acceptance for $ZZ \rightarrow llll$ from $H^o \rightarrow ZZ$ events with Higgs masses of 300 and 800 GeV.

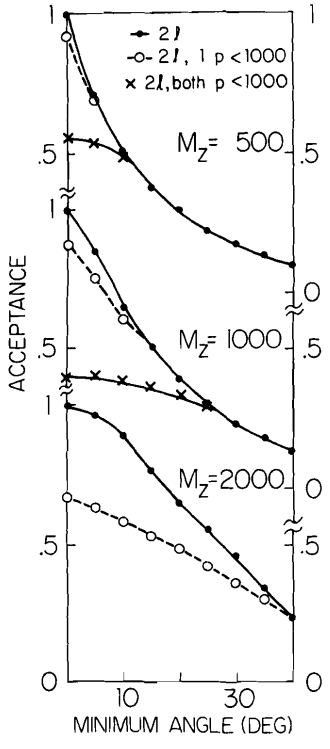

Fig. 7: Two-lepton angular acceptance for $Z_\chi \rightarrow ll$ for Z masses of 500, 1000 and 2000 GeV.

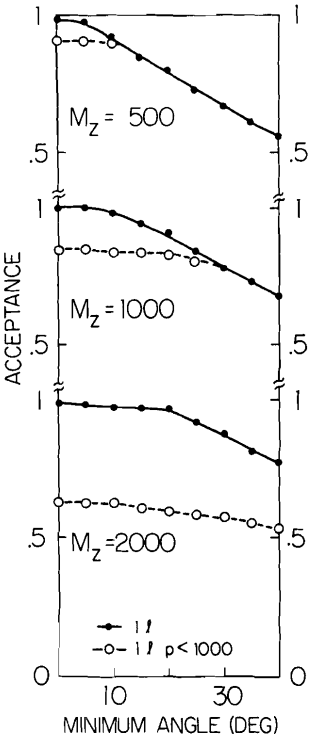

Fig. 8: Single lepton angular acceptance for $Z_\chi \rightarrow ll$ (either lepton) for Z masses of 500, 1000 and 2000 GeV.

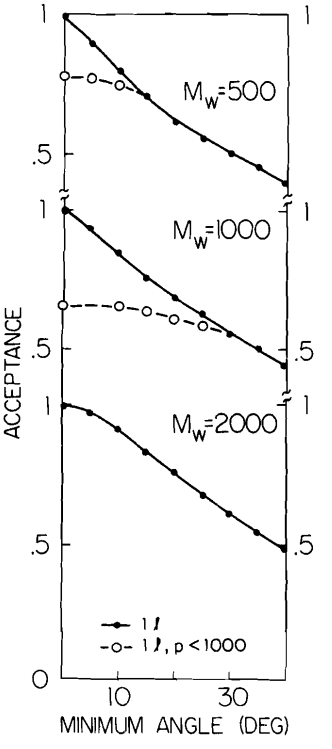

Fig. 9: Single lepton angular acceptance for $W \rightarrow l\nu$ for W masses of 500, 1000 and 2000 GeV.