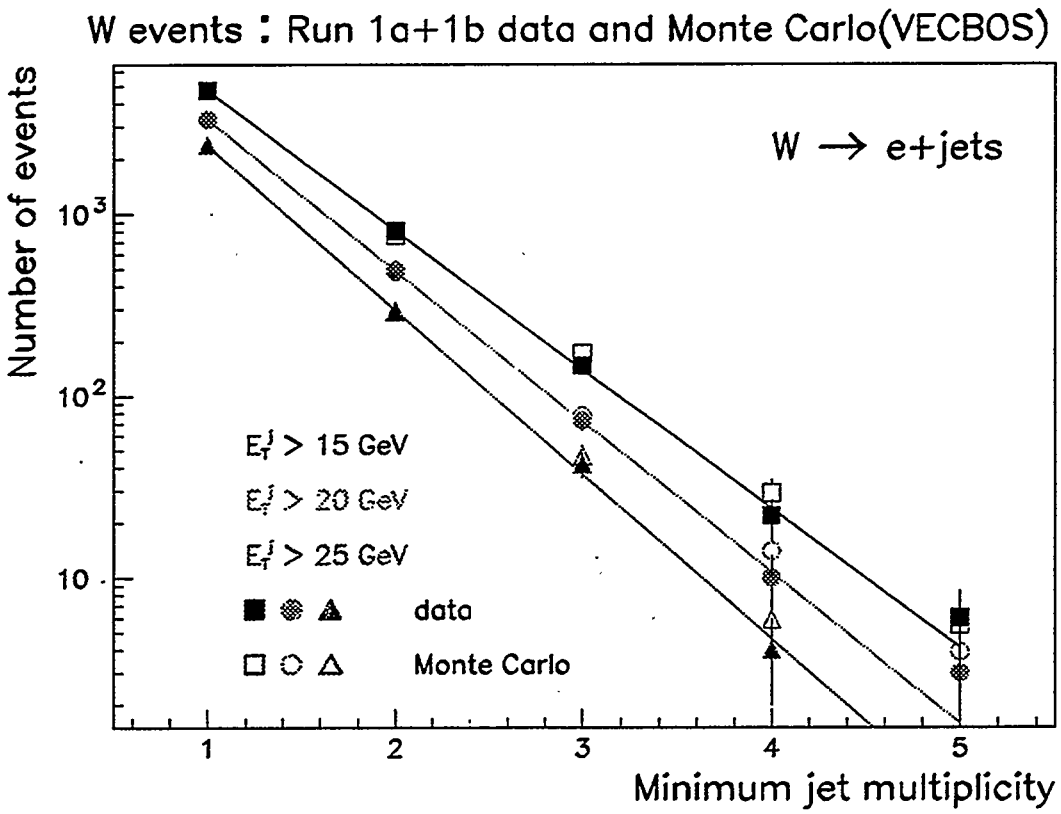

Figure 8: The rate of $W \to e\nu_e$ events as a function of the minimum jet multiplicity and jet E_T requirements observed by the DØ collaboration. These data are shown before the H_T or aplanarity cuts, and are compared to predictions from a QCD Monte Carlo calculation.

7.1.2 B Tagging in the DØ Sample

DØ has performed a separate analysis requiring that one of the jets also be consistent with a b quark semileptonic decay. This study is complementary to the DØ kinematical analysis, and does not depend on the jet-scaling arguments to estimate the backgrounds.

DØ's excellent muon identification capability makes it possible to tag b hadrons by searching for the decay $b \to \mu\nu_\mu X$. Because there are two b jets in each $t\bar{t}$ signal event, the fraction of tagged events will be twice the semileptonic branching fraction of b hadrons times the efficiency for identifying muons. DØ studies show that the use of standard muon identification requirements applied to candidates with $P_T >$ 4 GeV/c result in a tagging efficiency for $W+ \geq 3$ jet events of $\sim$ 20%. This is relatively insensitive to the actual top quark mass, rising slowly as a function of M_{top}.

"Fake" tags are expected to arise from real muons resulting from heavy quark (b, c) semileptonic decay and decays-in-flight of π and K mesons. This would imply that the fake rate per jet would remain relatively independent of the number of jets in a given event, or the topology of the jets in the event. The DØ collaboration has