

Comparison of DØ WH result at 174 pb⁻¹ with Prospective Study

	DØ Analysis	Prospective Study	Ratio
Phys. Rev. Lett. {94}, 091802 (2005).	174 pb ⁻¹ HW→ev	normalized to 174 pb ⁻¹ and to HW→ev only	$\frac{\text{Prospective}}{\text{DØ Analysis}}$
Dijet mass window	[85,135]	[100,136]	R=0.72
Dijet mass resolution	14 +/- 1 %	10 %	R=0.71
Signal events (S)	0.049	0.145	R=3.0
Background evts (B)	1.07	1.76	R=1.6
S/√B	0.045	0.11	R=2.4
S/B	0.046	0.082	R=1.8

Higgs Sensitivity report, CDF and D0 collab. Fermilab-pub-03/320-E

The Prospective Study use forward electrons (+30%), improved e-id with isolated track (+40%) and extended b-tag efficiency (+50% for 2 tags) → i.e 2.7 times more signal & bckgd. Also there is 30% less backgd (better dijet mass resolution) → we expect a higher S/√B (*2.0) for D0 analysis when propagating these improvements.

We observe a sensitivity ratio of 2.4. Hence, assuming that the previous assumptions can be propagated, we are missing for this channel, with this first analysis, only a factor 2.4/2.0=1.2 in sensitivity (translating in a factor of 1.5 additional lumi needed)

Other Factors available/necessary to reach the desired sensitivity:

2.5 (leptons) * 2.5 (channels) * 1.6 (Neural Network) * 2 (expts) = 20

Final lumi/present lumi: 8 fb⁻¹ /0.174 fb⁻¹ = 45 → total: 45*20=900 (30 in sensitivity)

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