NP dans DØ-France

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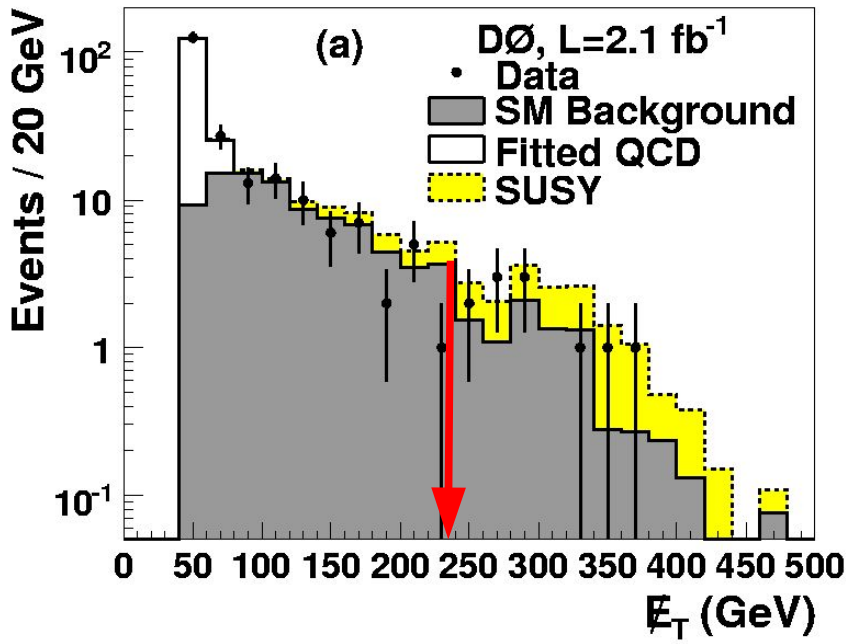
Grenoble – June 23th, 2008

Squarks-gluinos – jets+MET (I)

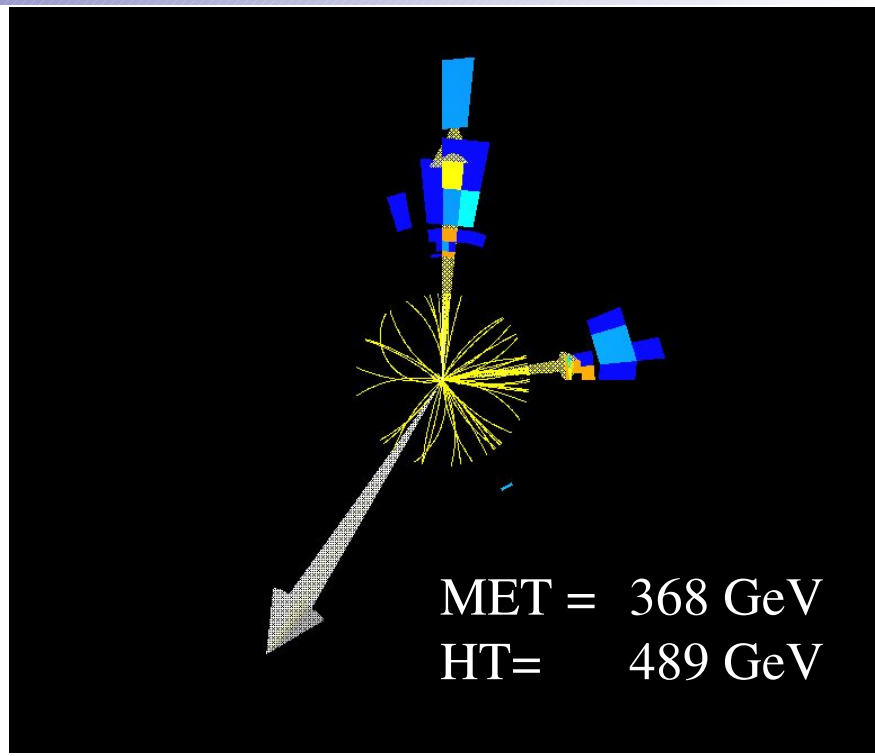
J.-F. Grivaz, P. Verdier

Phys. Lett. B660 (2008) 449

DØ at least 2 jets analysis



	at least 2 jets		at least 3 jets		at least 4 jets	
DØ	HT>325 & MET > 225		HT> 375 & MET > 175		HT> 400 & MET > 100	
	11	11.1 ±1.2 +2.9 -2.3	9	10.7 ±0.9 +3.1 -2.1	20	17.7 ±1.1 +5.5 -3.3



Systematic uncertainties

		DØ
JES		6-15%
jets		2-4%
trigger		2%
luminosity		6%
back. normalization	V+jets	15%
	ttbar	15%
	di-boson	15%
PDF (acceptance)		6%
ISR/FSR		6%

(PDF/scale effects on signal cross section next slide)

Squarks-gluinos – jets+MET (II)

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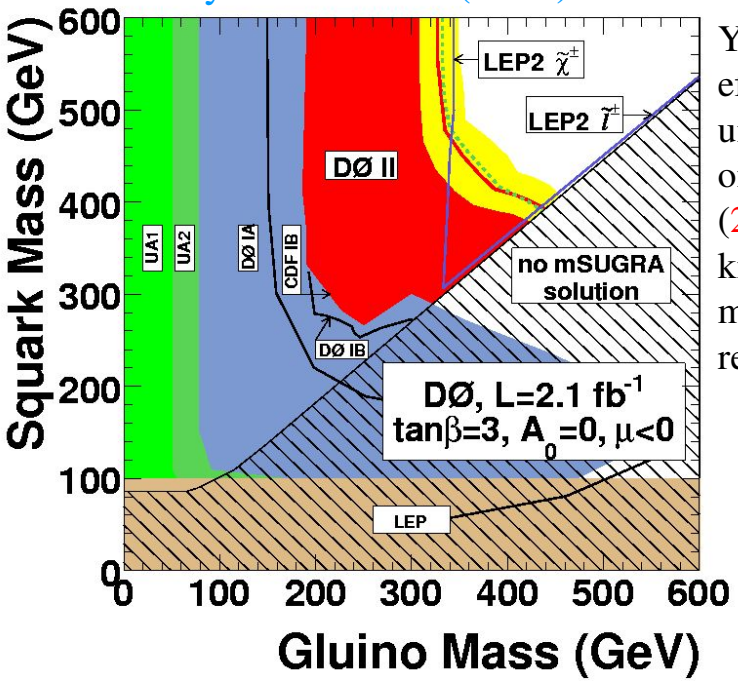
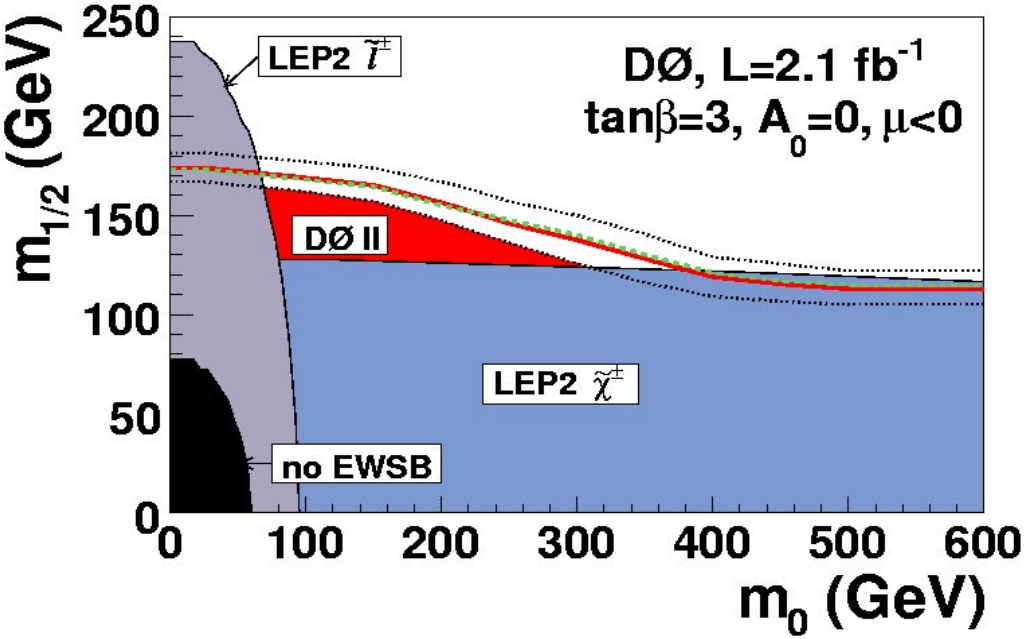


Yellow band shows the huge effect of PDF (and RF scale) uncertainty (CTEQ6.1M) on the signal NLO cross section (25 to 75%) due to the poor knowledge of gluon at high x: more constrains will come from recent QCD results from DØ

Results can also be shown as a function of the mSUGRA parameters



$\tan(\beta)=3$, $A_0=0$, $\mu<0$

	M(Gluino)		M(Squark)	
	obs.	exp.	obs.	exp.
σ(min)	308	312	379	377
σ(nom)	327	332	392	391
σ(max)	349	354	406	404

Most conservative case: signal cross section diminished by its uncertainty due to PDF/RF scale

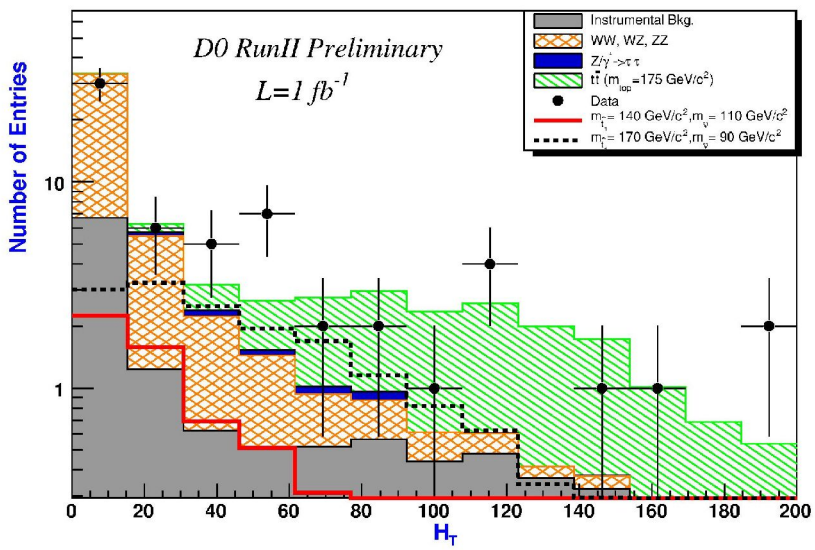
LEP2 limits improved for m0 between 70 and 300 GeV

Stop -> blsnu

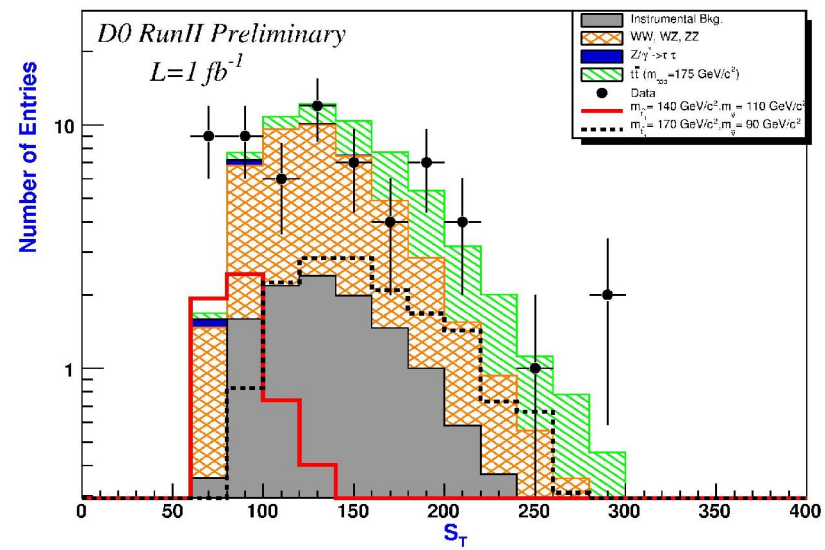
P. Gris, F. Tissandier

- Large top-yukawa impact in RGE
- large mixing in the 3rd generation squark sector:
  - the lightest stop could be the NLSP

- stop -> b l snu : DØ update with $1fb^{-1}$
- Pair production of stop squarks
- R-parity conservation
- emu channel (ee channel in progress)

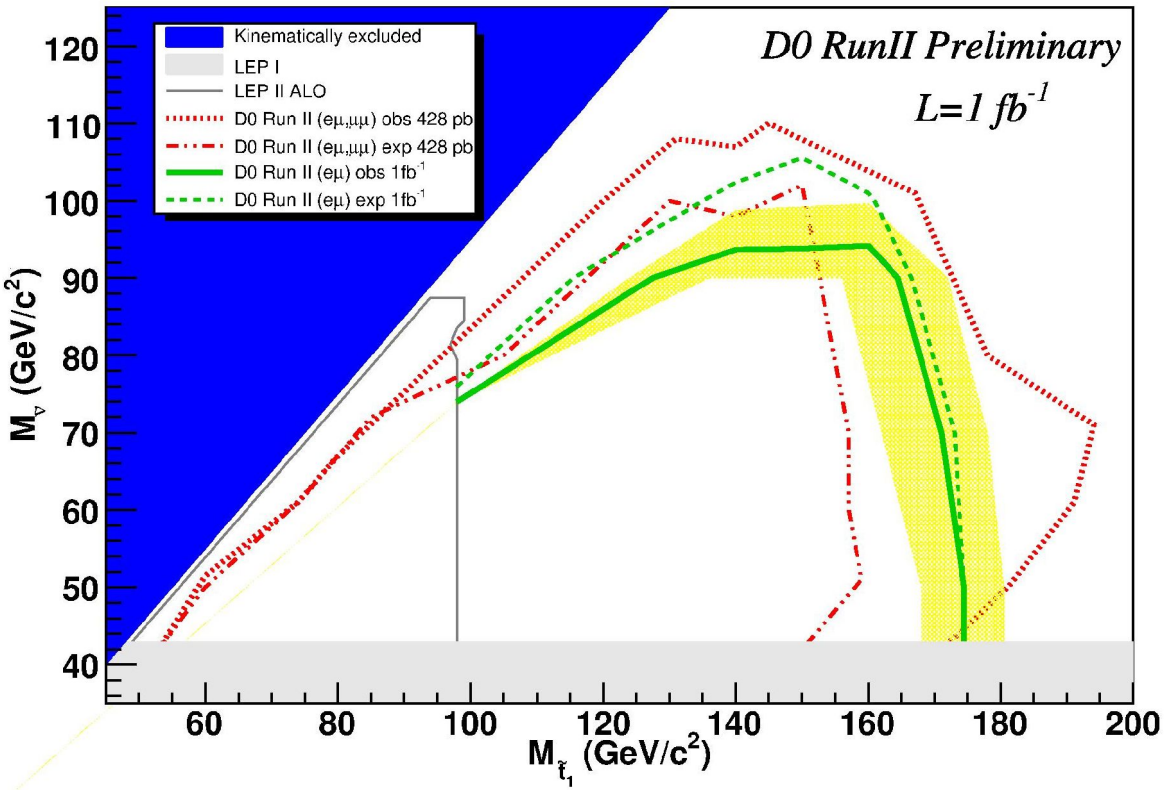


HT



ST

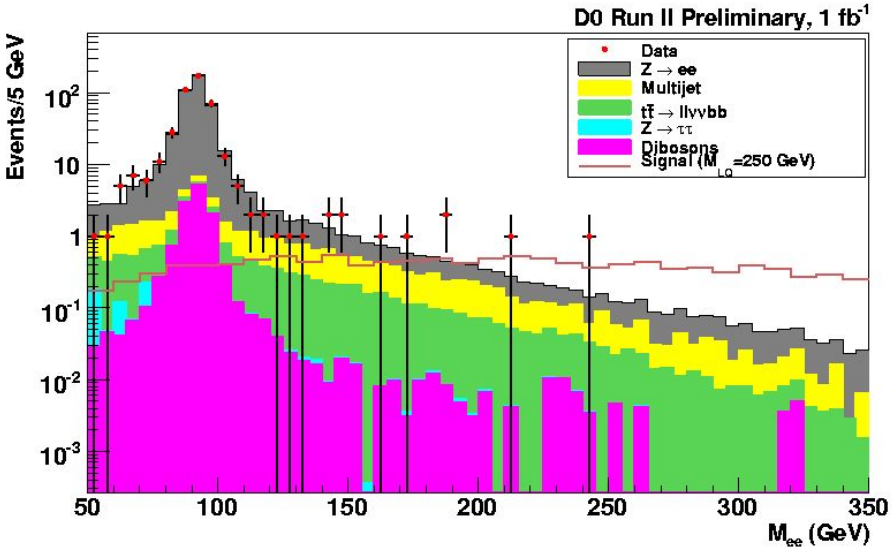
Stop -> blsnu

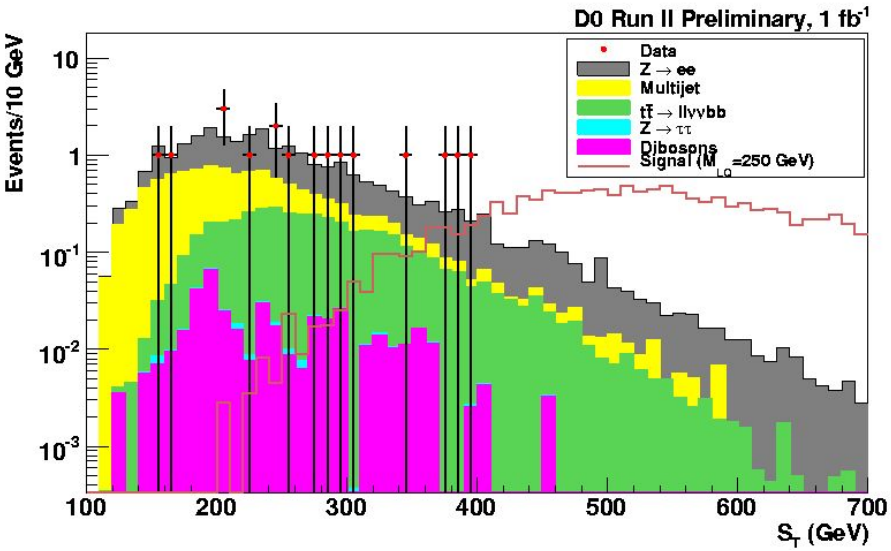

Kinematically excluded
LEP I
LEP II ALO
D0 Run II (eμ,μμ) obs 428 pb
D0 Run II (eμ,μμ) exp 428 pb
D0 Run II (eμ) obs 1fb-1
D0 Run II (eμ) exp 1fb-1
D0 RunII Preliminary
L=1 fb-1
M_ν (GeV/c²)
M_t̃1 (GeV/c²)
120
110
100
90
80
70
60
50
40
60
80
100
120
140
160
180
200

1st generation LQ

A.-F. Barfuss, M.-C. Cousinou

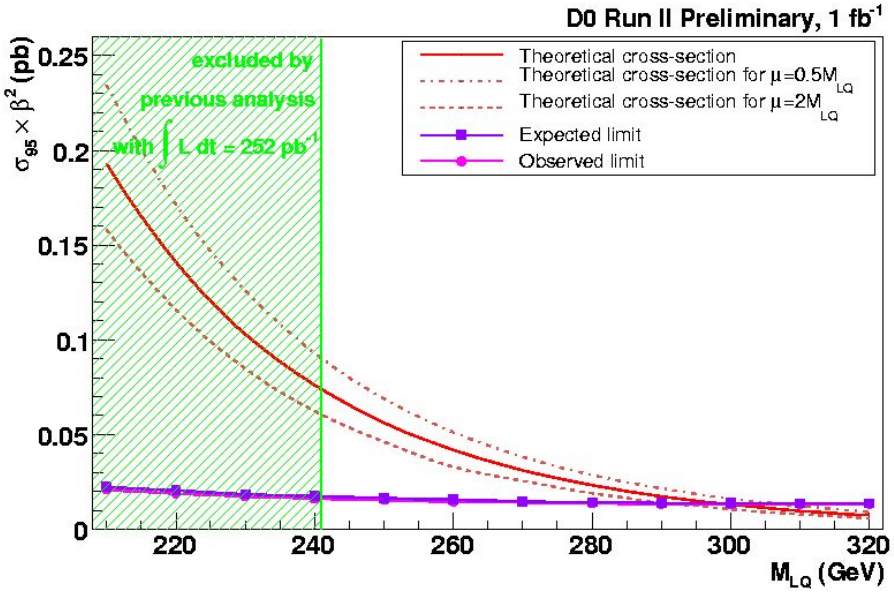
- Pair production of 1st generation LQ:
  - RunIIa data (1 fb^{-1})
  - eeqq channel (enuqq channel in progress)
  - 2 electrons with pT>25 GeV, and 2 jets with pT > 25 GeV



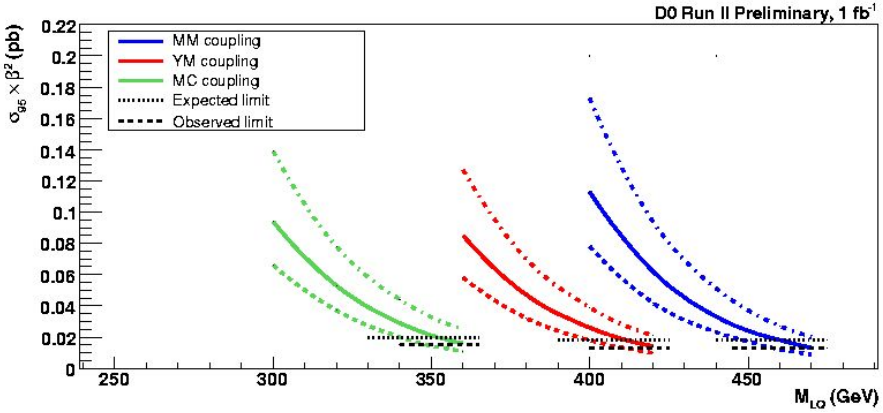


1st generation LQ

Scalar LQ's



Vector LQ's

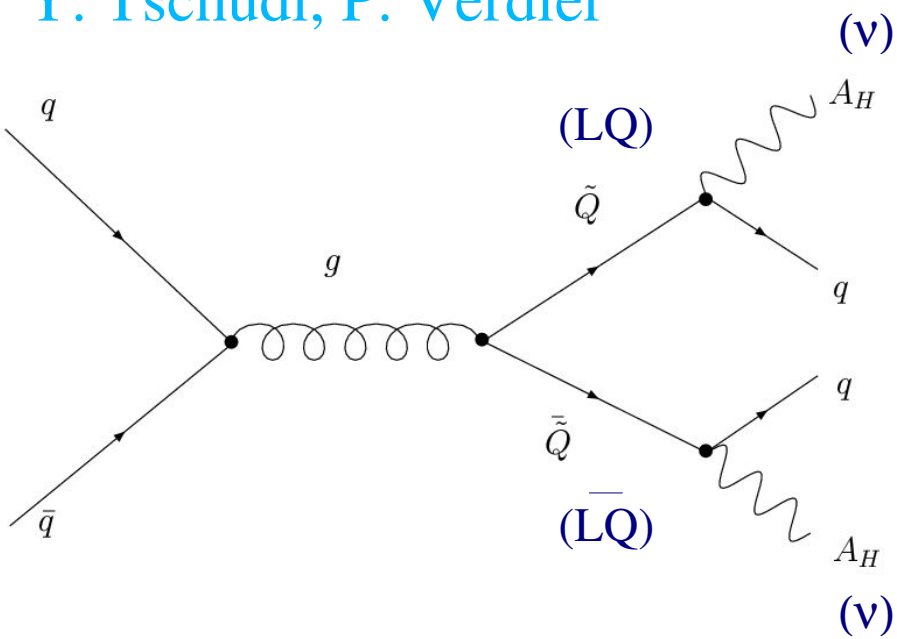


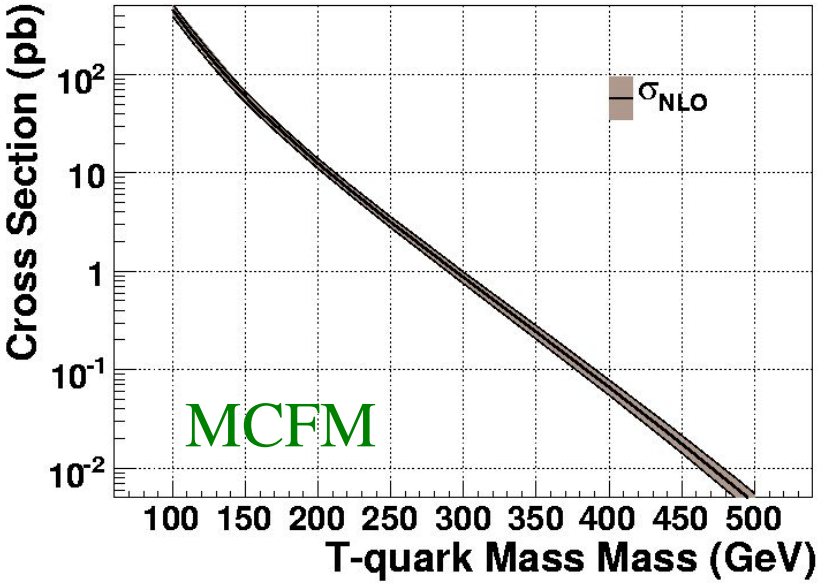
- New limits on scalar LQ's mass for β=1:
  - M(LQ) > 292 GeV
  - (Previous published limits by DØ: 241 GeV with ~250 pb^{-1})

- Limits for different Vector LQ's couplings:
  - MM: > 458 GeV
  - YM: > 410 GeV
  - MC: > 350 GeV

Acoplanar dijet topology

Y. Tschudi, P. Verdier



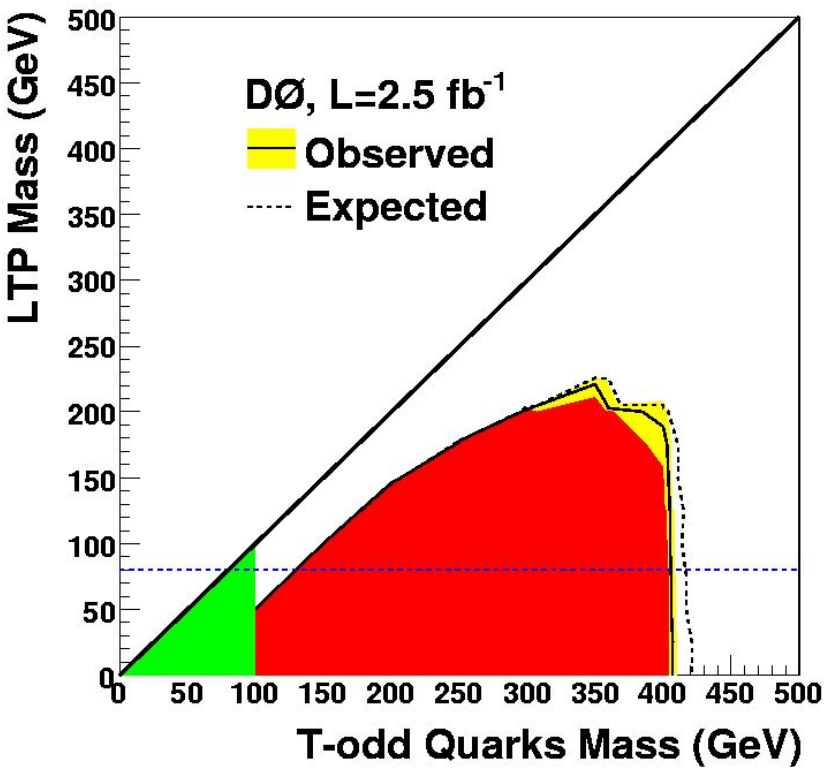


- Little Higgs model with T-parity:
  - SM particles : T-even
  - T-odd quarks (T-quarks), same spin as quark
  - Lightest T-odd particle (LTP) = "heavy photon", M >~ 80 GeV , weakly interacting
  - Pair produced (1st and 2nd generation only were considered)
  - cross section : 4 times the ttbar cross section

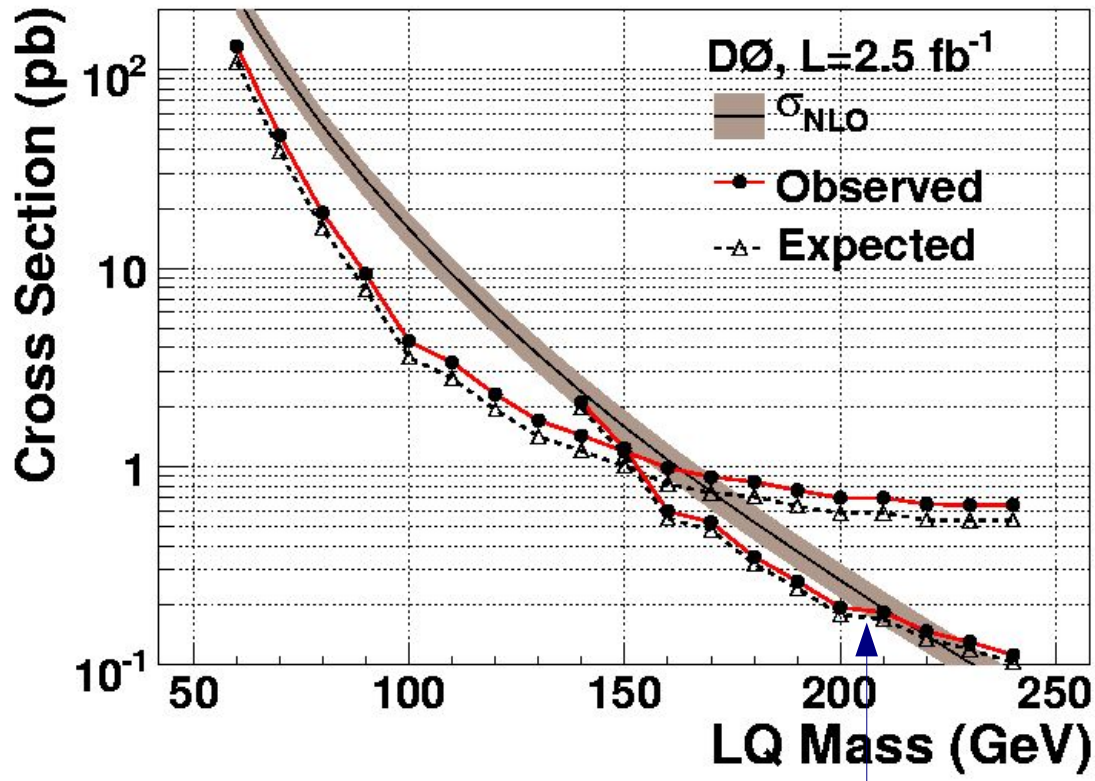
- Analysis:
  - T-quark -> q AH (assuming it is 100%)
  - => 2 jets + MET
  - lepton + isolated track veto to reduce the W+jets, ttbar, di-boson backgrounds
  - exactly 2 jets (no 3rd jet with pT>15 GeV)

Acoplanar dijet topology

LHT model



1st Generation scalar LQ: β=0



205 GeV

- Previous limits:
  - >136 GeV (DØ, 310 pb^{-1}) published
  - >177 GeV (CDF, 2 fb^{-1}) preliminary

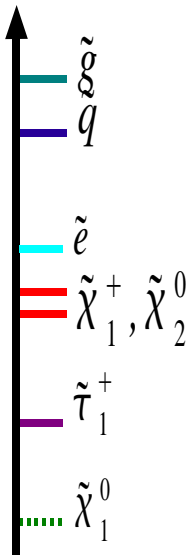
Conclusion

- Depuis ~1 an, la publication des résultats du RunIIa a représenté la plus grande partie du travail dans le groupe NP
- Très peu d'analyse avec les données du RunIIb
- Représentation de DØ-France dans le groupe NP après septembre 2008 ?

Back up

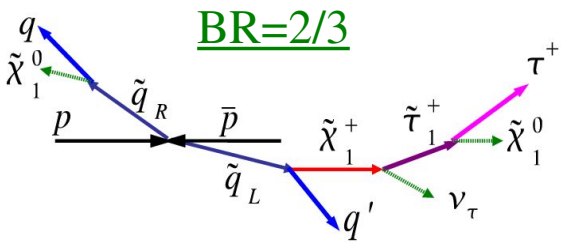
Squarks-gluinos – jets+tau(s)+MET

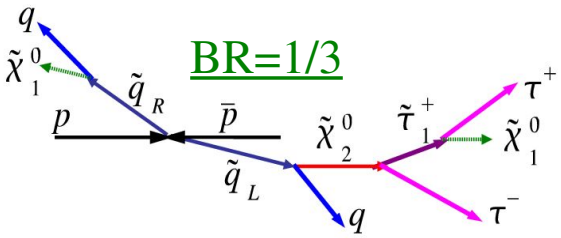
C. Biscarat

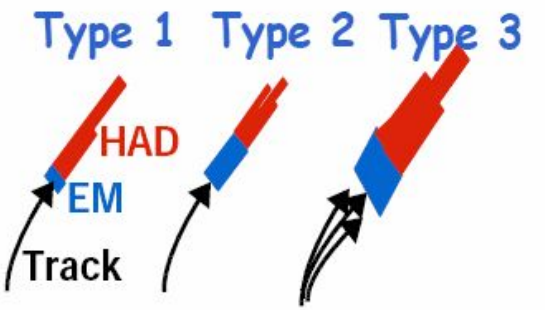


$$\begin{pmatrix} M^2_{\tilde{\ell}_L} + m^2_\ell & m_\ell \times (A_\ell - \mu \tan\beta) \\ m_\ell \times (A_\ell - \mu \tan\beta) & M^2_{\tilde{\ell}_R} + m^2_\ell \end{pmatrix}$$

- Large mixing in the stau mass matrix => stau1 NLSP
- Final states saturated in taus
- mSUGRA parameters: tan(β)=15, A0=-2m0, μ<0
- Consider squark pair production







- RunIIa data sample: 0.96 fb^{-1}
  - jets+MET identical to generic squark-gluino search (previous slides)
  - Require at least one tau decaying hadronically(pT>15 GeV, |eta|<2.5)
  - re-optimisation of the final cut on HT and MET
  - 2 events observed for exp. back. $1.7 \pm 0.2(stat)^{+0.6}_{-0.3}(syst)$
  - excluded squark masses up to 366 GeV
  - this is a complementary analysis to:
    - generic squarks-gluino: jets+MET
    - trileptons (when the 3rd lepton pT is too small)