SUPERSYMMETRY SEARCHES AT CDF & D0 IN RUN I and RUN II at the TEVATRON

Aurore Savoy-Navarro
FNAL & CNRS/France
on behalf of CDF & D0 collaborations

OUTLINE:

- *SUSY scenarios:*
  MSSM/mSUGRA, RPV, GMSB
- *RUN I searches & results on:*
  - *light Gravitino*
  - *gluinos & squarks*
  - *charginos and neutralinos*
  - *photon enriched SUSY*
  - *3rd generation squarks*
- *PROSPECTS for RUN II*

EPS CONFERENCE 15-21 July, Tampere.

SUSY FRAMEWORK(S)

MSSM with M as MINIMAL FIELD CONTENT

+

INPUTS

CDF		D0
MSSM with:		Minimal SUGRA (mSUGRA)
Quark & gauge universality		universality at M(GUT) or M(Pl)
$m(\text{gluino}) = M_{1/2}$	$\longleftrightarrow$	$M_{1/2}$ common mass for all gauginos at unification scale
m(squark) (5 $\tilde{q}$ degenerated in mass) $m(\tilde{q})^2 = 0.9\, m(\tilde{g})^2 + M_0^2$	$\longleftrightarrow$	M_0 common scalar mass at unification scale
$A_t = \mu / tg\ \beta$ $A_b = \mu\ tg\ \beta$		A_0 common trilinear coupling among scalars
$tg\ \beta$	$\longleftrightarrow$	$tg\ \beta$
μ (no universality M_1^2, M_2^2) $M(H_A) = 500$ GeV		sign(μ) determined from other parameters

In most studies, CDF uses:
μ =-400 GeV, $tg\,\beta$ =4 (or 2), A_t=-100GeV

In most studies, D0 uses:
μ <0, $tg\beta$ =2 (or varied up to 10)
A_0=0 (sometimes scan (M_0, $M_{1/2}$)

CDF & D0 scenarios rather the sames BUT slight differences !!

INTRODUCE R-PARITY VIOLATION

$R_P = (-1)^{3B+L+2S}$ with: B= BARYON NUMBER
L= LEPTON NUMBER
S=PARTICLE SPIN

extra discrete symmetry

$\boxed{\text{SM: } R_P = +1 \qquad \text{SUSY: } R_P = -1}$

→ Most general superpotential:

$$W_{SUSY} = W_{MSSM} + W_{RPV}$$

After rotating Higgs term away:

$$W_{RPV} = \lambda_{ijk} L_i L_j \bar{E}_k + \lambda'_{ijk} L_i Q_j \bar{D}_k + \lambda''_{ijk} U_i \bar{D}_j \bar{D}_k$$

violate L

violate B

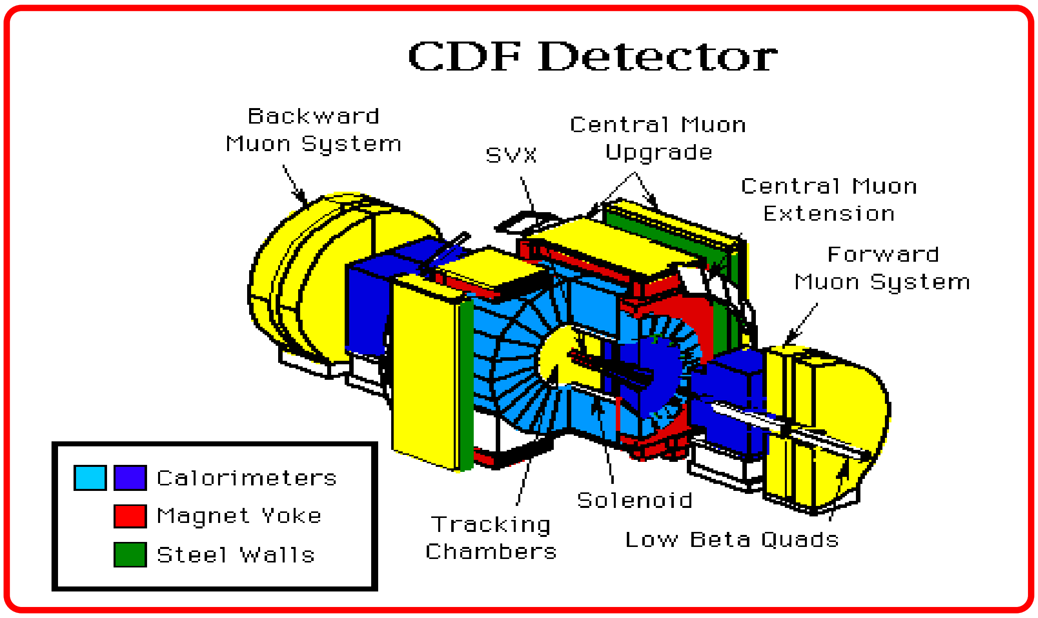
- B violation search at hadron collider is extremely difficult due to QCD
- Focus on L violation searches looking for LS dilepton & multilepton signatures

GMSB MODELS

- SUSY breaking at low mass scale $F^{1/2}$, GLOBAL symmetry
- GRAVITON has a spin 3/2 partner the GRAVITINO $\tilde{G}$
- Low $F^{1/2}$ leads to a low GRAVITINO mass =F/M(Pl)
  GRAVITINO = LSP
- Phenomenology depends upon what is the NLSP:
  neutralino or slepton or stau
- Decay length of NLSP to $\tilde{G}$, proportional to $m_{\tilde{G}}$ can be quite long. Generally considered in CDF & D0 analyses $\tilde{\chi}^0_1$ = NLSP and decays into photon and Gravitino

RUN I AT THE TEVATRON

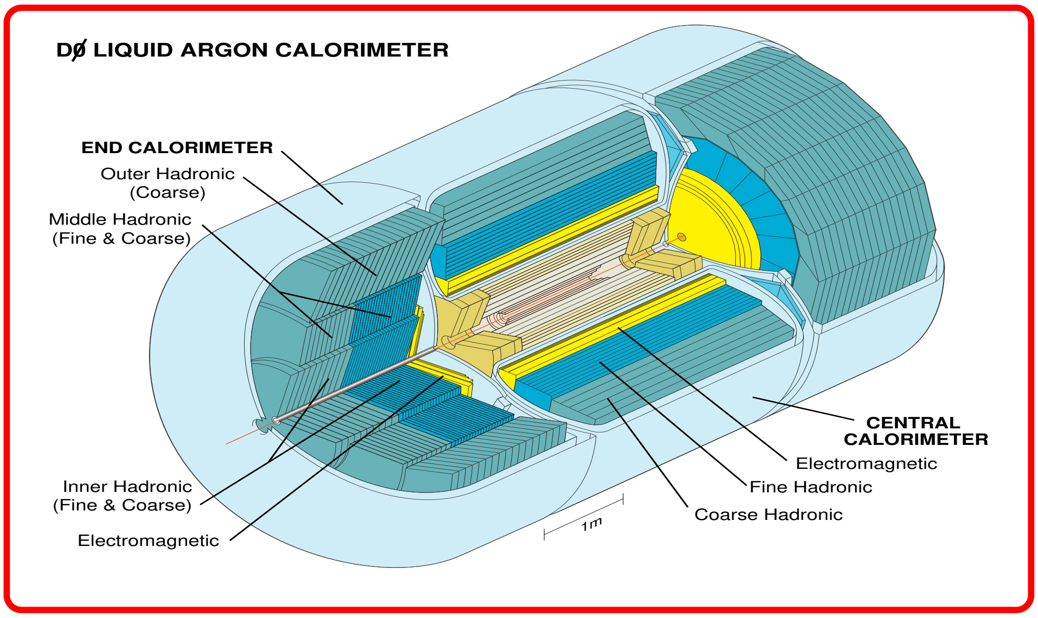
- ***THE TEVATRON run, from 92 to 95, @ :***
  c.m.s energy = 1.8 TEV
  L= [20 (IA) + 90 (IB)] = 110 pb-1
- ***THE DETECTORS :***



tracking :

b &

lepton $\pm$



calorimetry:

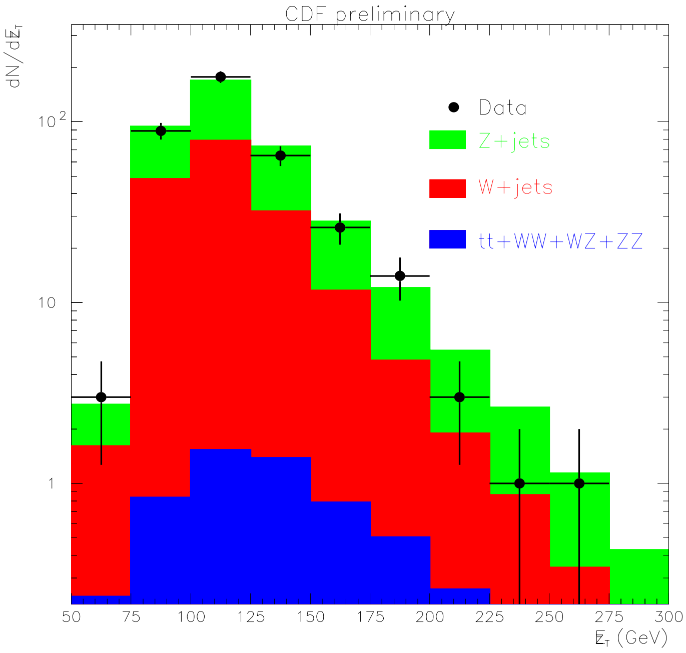
e / γ

Etmiss

EXPERIMENTAL SIGNATURES (production & decays)

sparticle	production	SUSY frame	signature	Expt.
$\tilde{G}$ (LSP)	$q\bar{q},g \to \tilde{G}\tilde{G}g$ $g,g\bar{q} \to \tilde{G}\tilde{G}\bar{q},g$	GMSB	Monojet+Etmiss	CDF
$\tilde{g}$, $\tilde{q}$	$\tilde{g}\tilde{g}$ or $\tilde{q}\tilde{q}$	MSSM/ mSUGRA	Etmiss + n jets	CDF/D0
$\tilde{g}$, $\tilde{q}$	$\tilde{g}\tilde{g}$ or $\tilde{q}\tilde{q}$	MSSM/ mSUGRA	dileptons+njets+ Etmiss	CDF/D0
$\tilde{g}$, $\tilde{q}$	$\tilde{g}\tilde{g}$ or $\tilde{q}\tilde{q}$	RPV	SS dileptons+jets dielectrons+jets	CDF D0
$\tilde{\chi}^0_1$	$\tilde{\chi}^0_1\tilde{\chi}^0_1$	RPV	quadleptons	CDF
$\tilde{\chi}^0_2$, $\tilde{\chi}^{\pm}_1$	$\tilde{\chi}^0_2\ \tilde{\chi}^{\pm}_1$	MSSM	trileptons	CDF/D0
		MSSM	SS dileptons	CDF
$\tilde{\chi}^0_2$, $\tilde{\chi}^{\pm}_1$	$\tilde{\chi}^0_2\tilde{\chi}^{\pm}_1$	MSSM	γ b Etmiss	CDF
		GMSB	$\gamma\ \gamma$ Etmiss	CDF/D0
$\tilde{g}$, $\tilde{q}$	pair prod.	GMSB	γ Etmiss+>1jet	D0
$\tilde{b} \to b\tilde{\chi}^0$	$\tilde{b}\ \tilde{\bar{b}}$	MSSM	b-tag + Etmiss	CDF/D0
$\tilde{t} \to c\ \tilde{\chi}^0$		MSSM	c-tag + Etmiss	CDF/D0
$\tilde{t} \to b\ \tilde{\chi}^+$	$\tilde{t}\ \tilde{\bar{t}}$		b-tag + Etmiss	CDF
$\tilde{t} \to b\ l\ \tilde{\nu}$			b lepton Etmiss	CDF
$t \to \tilde{t}\ \tilde{\chi}^0$	$t\ \ t$	MSSM	b+l+jets+Etmiss	CDF

LIGHT GRAVITINO SEARCH RESULTS:



W/Z + jets: IRREDUCIBLE
normalized to Z-> ee+jets

Optimal Etmiss cut: 200 GeV

Expect 10.1 $\pm$ 3.4 backgd
5 observed

$$\sigma^{eff}(\text{Etmiss} > 200\ \text{GeV}) > 93\ \text{fb at } 95\ \%\ \text{C.L.}$$

$$F^{1/2} > 221\ \text{GeV}$$

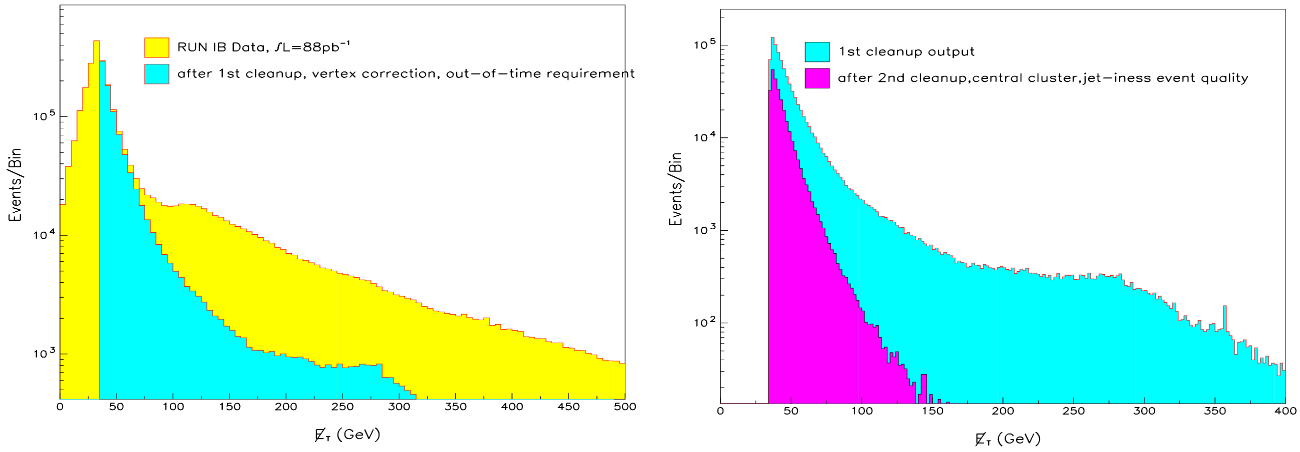
$$m_{\tilde{G}} > 1.2\ 10^{-5}\ \text{eV}$$

NOTA BENE:

In the case of a light Gravitino, all other super-partners are heavy, and the Gravitino could be the ONLY super-partner produced at the Tevatron

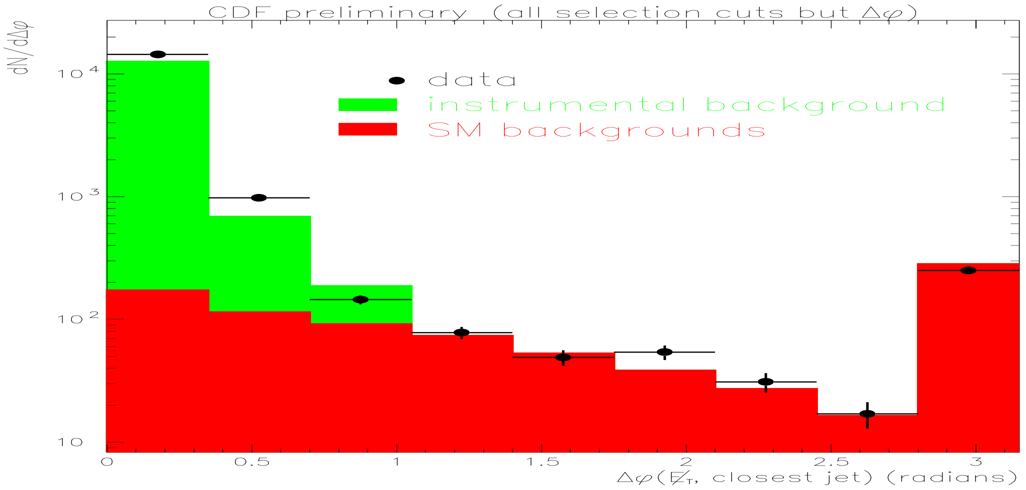
$$q\,q \to \tilde{G}\tilde{G}g,\quad qg \to \tilde{G}\tilde{G}q,\quad gg \to \tilde{G}\tilde{G}g$$

Search for a light Gravitino at CDF



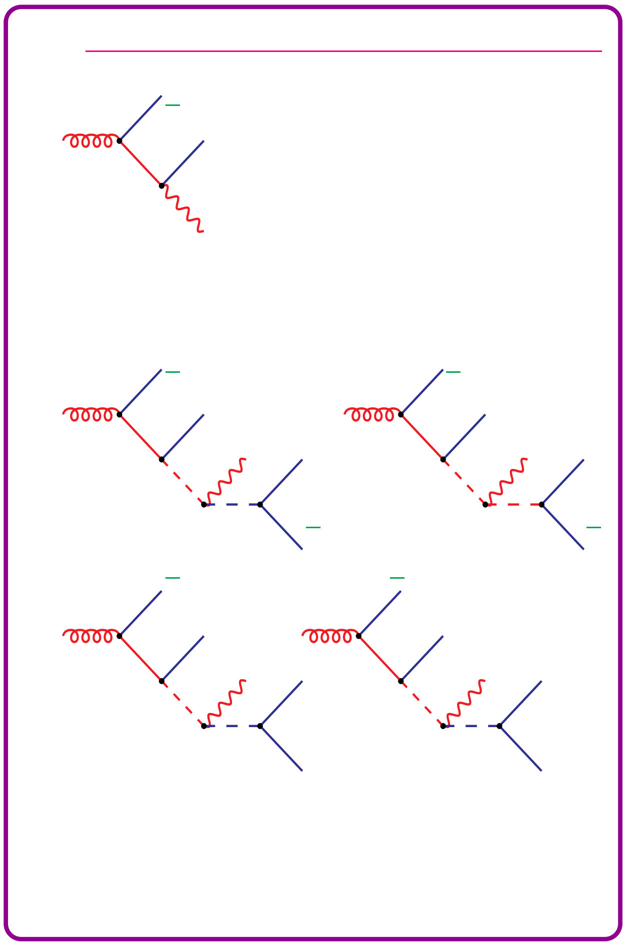
Select "high Et jet & large Etmiss" topology

- **Et(jet) > 80 GeV**
- **Etmiss > 200 GeV**
- **Clean up "junk" Etmiss backgrounds**
- **Lepton removal including isolated tracks**
- **$\delta\,\Phi$ (jet, Etmiss) > 90 degrees**



Backgrounds:

Instrumental & SM: W/Z + jets, tt+WW+WZ+ZZ



gluino & squark decays

direct decays: $\tilde{q} \to q\tilde{\chi}^0_1$

$\tilde{g} \to q\,q\tilde{\chi}^0_1$

jets + Etmiss

cascade decays: $\tilde{q} \to q\tilde{\chi}^{\pm}_1,\ \tilde{\chi}^0_2$

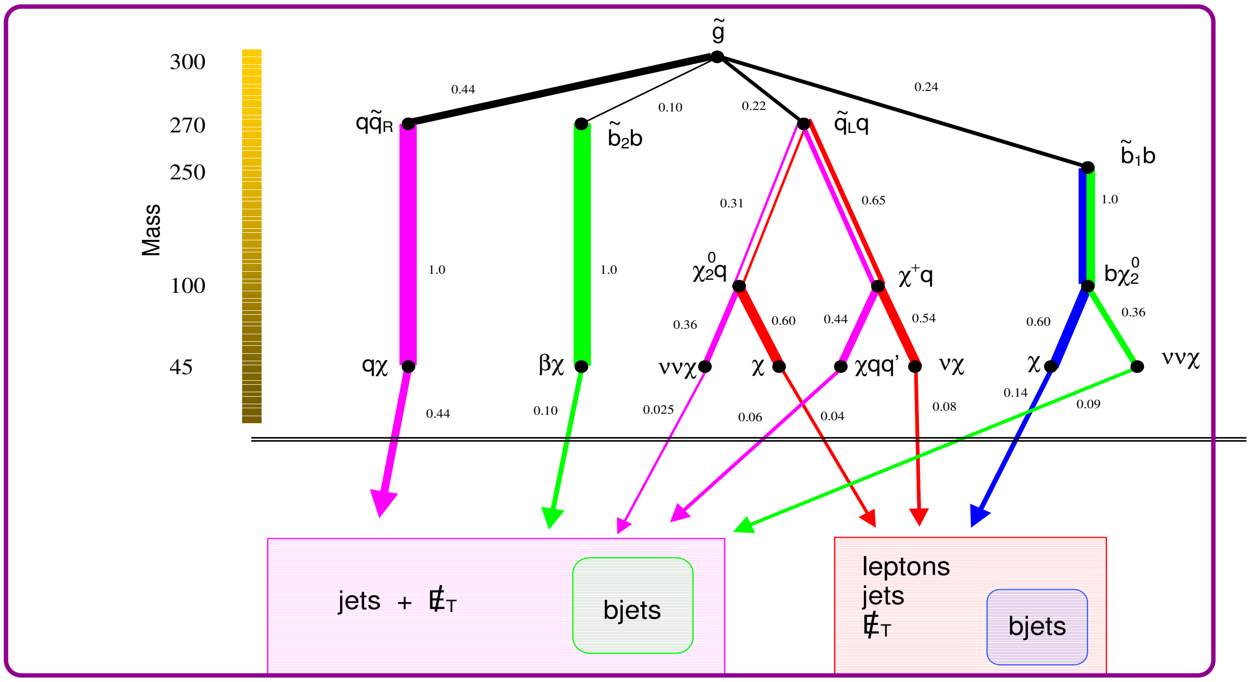
$\tilde{g} \to q\,\bar{q}\tilde{\chi}^{+}_1,\ \chi^0_2$

jets + Etmiss OR leptons + jets + Etmiss

D0: mSUGRA, $tg\beta = 2, \mu < 0, A_0 = 0$

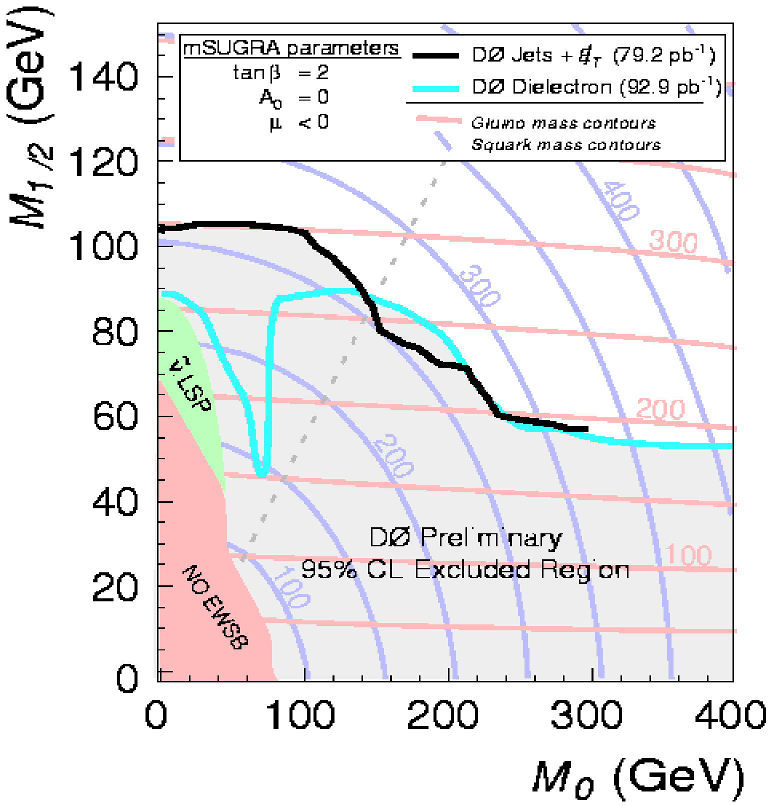
CDF: MSSM $tg\beta = 4$ or $2, \mu < 0$

Z!! STRONG SENSITIVITY to the model parameters



GLUINOS & SQUARKS SEARCHES at D0

alysis optimized for mSUGRA models h $A_0 = 0$, tgβ =2, μ <0, using the next-leading order cross-section by PROSPINO



Selection (80 pb-1)

- *3 or more jets with Et> 25 GeV*
- *Leading jet Et > 115 GeV*
- *Etmiss > 75 GeV*
- *Etmiss - jet correlation cut*
- *Optimized Etmiss - Ht cut*

Backgrounds

QCD multijets, $\bar{t}$t, W/Z + jets

Shape analysis to estimate residual QCD background

No excess of events

Detection efficiency is typically a few % for the signal

Results:

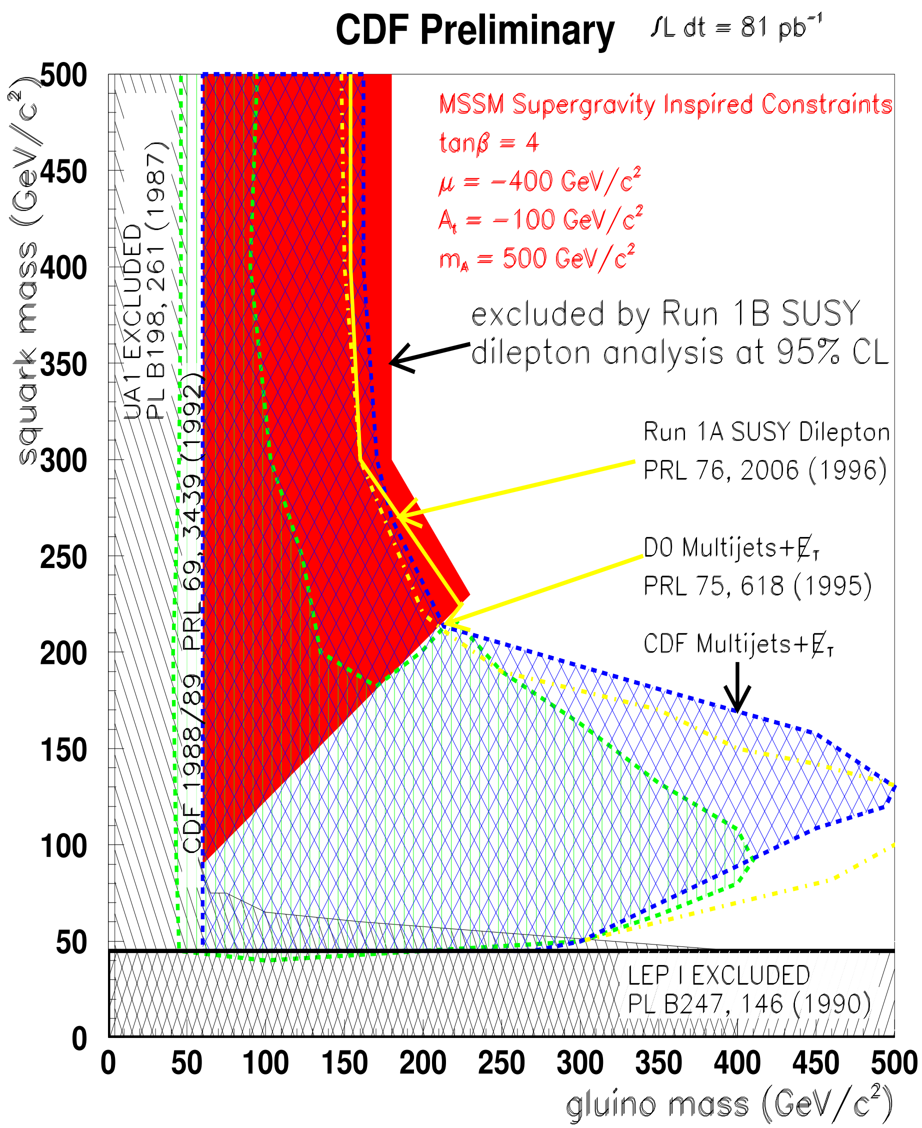
$m_{\tilde{q}} > 250$ GeV, $m_{\tilde{g}} > 260$ GeV

@ 95% C.L.

GLUINOS & SQUARKS SEARCHES

Etmiss + njets at CDF

still in progress, only RUN IA



GLUINOS & SQUARKS SEARCHES at D0 in dileptons plus 2 jets plus Etmiss

Selection (108 pb-1 for ee and e μ , 103 pb-1 for μ μ)

- *2 leptons with varying Et requirement*
- *2 jets with Etmiss > 20 GeV*
- *Etmiss > 20, 30, 40 GeV*

Backgrounds:

QCD, $t\bar{t}$, W/Z + jets

Criteria optimized for every MC point studied to achieve maximum S/B discrimination

NO EXCESS IS OBSERVED

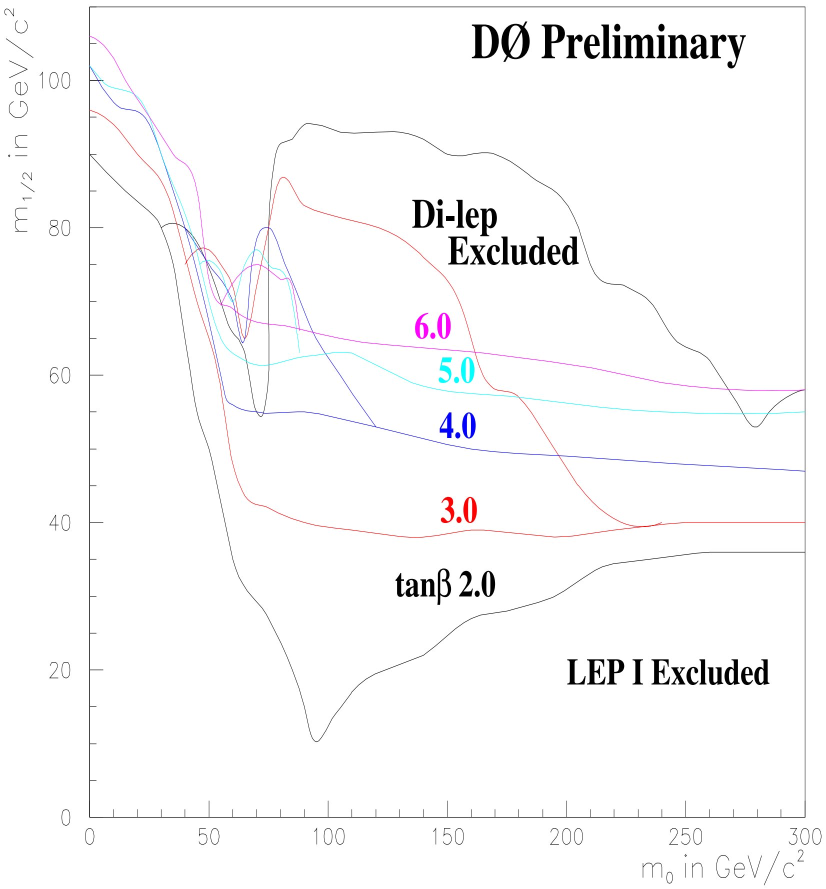
$m_{\tilde{g}} \gtrsim 129\ GeV/c^2$

$m_{\tilde{q}} \gtrsim 138\ GeV/c^2$

for $m_0 > 300\ GeV/c$ *& tg* $\beta > 10.$

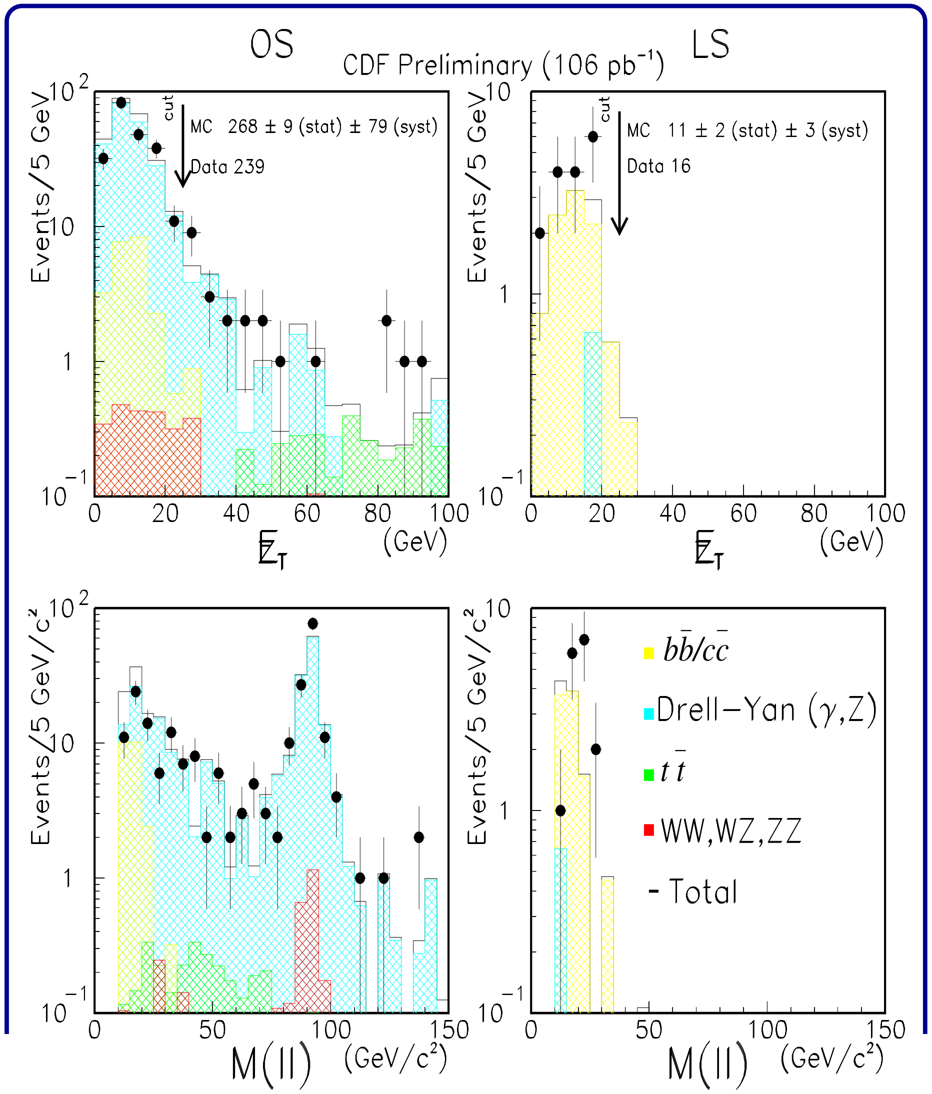
(M.C. = SPYTHIA)

95% Exclusion Contours



Squarks & gluinos searches at CDF
looking for LIKE-SIGN dileptons plus jets evts.

Selection: Starts from the SUSY dileptons data sample (460 Kevts)

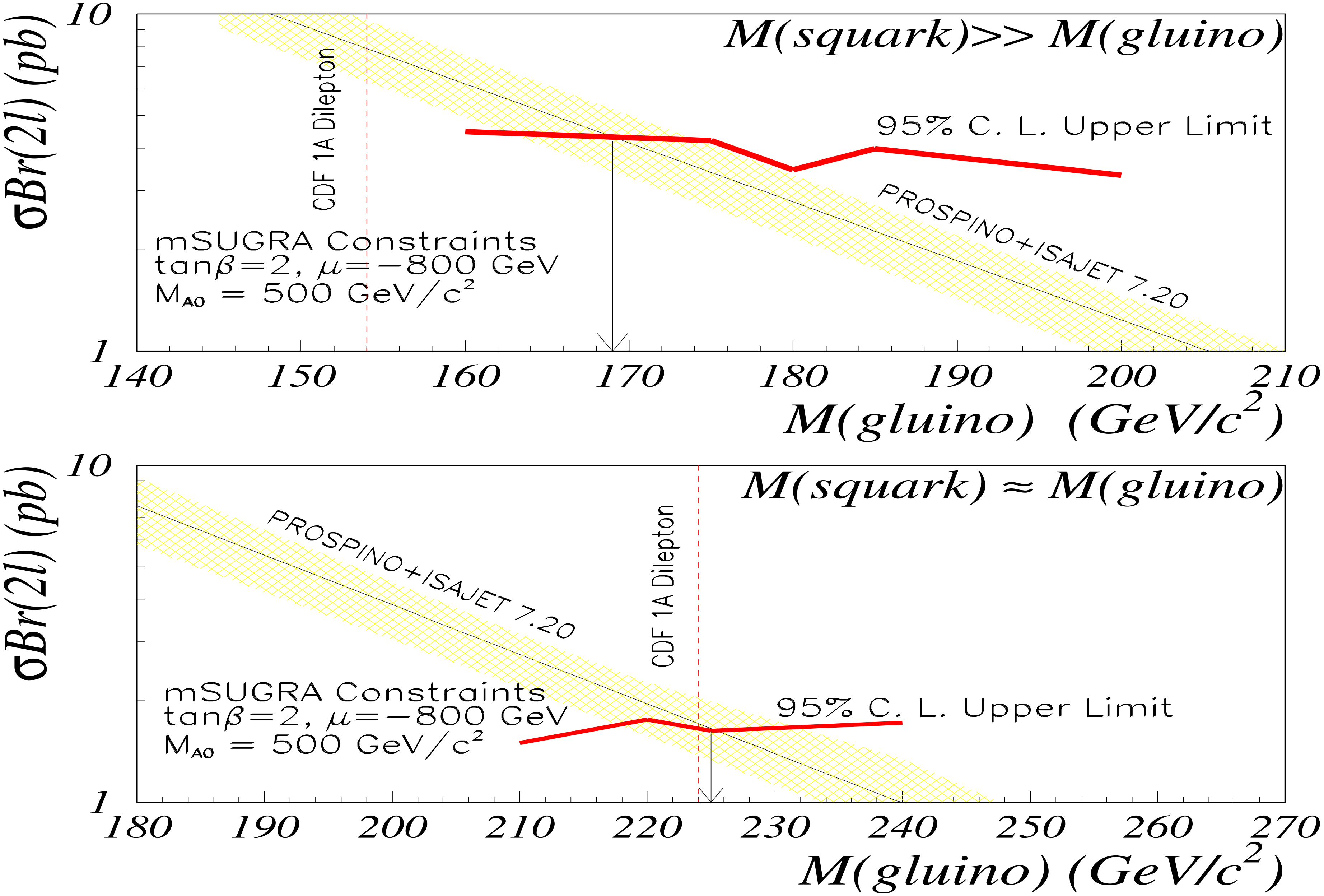


- like sign dileptons with: Et > 11 , 5 GeV
- isolation (calo & track) < 4 GeV
- $|\eta| <$ or = 1.1
- 2 or more jets with Et > 15 GeV $\Delta R(jet) = 0.4$, $|\eta| < 2.4$
- Etmiss > or = 25 GeV and correlated for all μ /jets

Backgrounds:
D.Y. tt, bb, cc, dibosons

Results:
No event observed with 0.6 + or - 0.3 expected from backgrounds

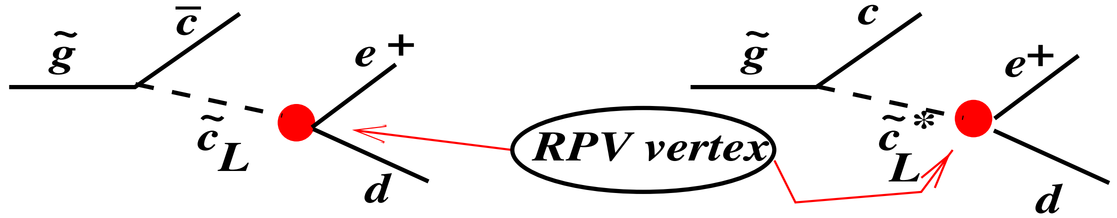
CDF Preliminary (106 pb^{-1})



RPV searches for gluinos & squarks (stop incl.)

LIKE SIGN dileptons + 2 jets evts, by CDF

If RPV via coupling $\lambda'_{121}\ L_1 Q_2 D^c_1$ interaction



For gluino pair production or neutralino decay, Proba for LS or OS dielectrons is equal (Majorana particles).

$\Rightarrow$ **EXPLOIT LS: low SM bkgds.**

$p\bar{p} \to \tilde{g}\tilde{g} \to \bar{c}\tilde{c}\bar{c}\tilde{c} \to cc\,(l^+d)(l^+d)$

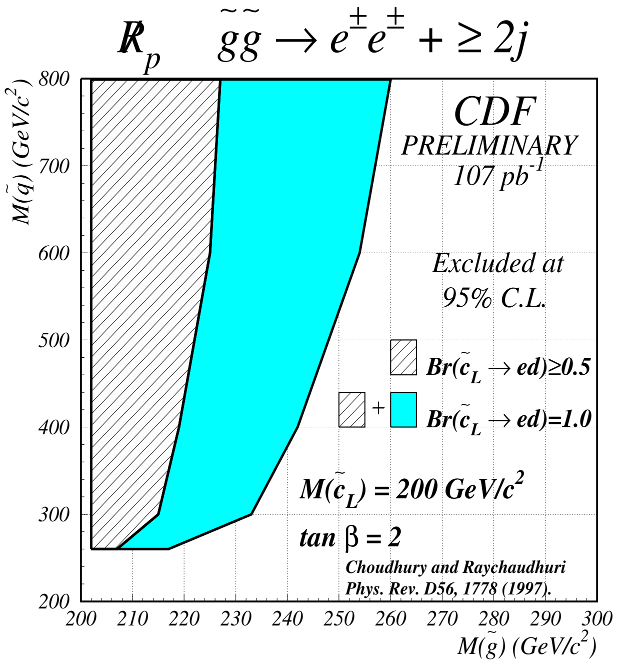
Assume: $m(\tilde{c})=200$ GeV/c^2 (hera)

Selection: L = 107 pb-1

- 2 LS electrons, Et > 15 GeV
- well isolated
- $|\eta(e)| > 1.1$
- $N(j)>1$, $Et(j)>15$ GeV, $|\eta(j)| > 2.4$
- $S = Etmiss/(\Sigma Et)^{1/2}$

  $S < 5\ GeV^{1/2}$

  (i.e. no significant Etmiss)



165 OS & NO LS left.

$m(\tilde{q}) < 260$ GeV -> no limit on $m(\tilde{g})$

$m(\tilde{q}) = 800$ GeV -> $m(\tilde{g}) > 260$ GeV

(if Br $\tilde{c}_L$ -> ed =1.0)

Study of λ'_{121} using the muon channel: to come soon.

LIKE SIGN dileptons + 2 jets events at CDF (ct'd)

Same as before but look for LEPTON NUMBER violating $\tilde{\chi}_1^0$ decay in L.S. dilepton + > 1 jet

$$\tilde{t}\,\tilde{t} \to (c\ \tilde{\chi}_1^0)\ (c\,\tilde{\chi}_1^0) \xrightarrow{\text{RPV}} c\,(q\,q'\,e+)\ c\,(q\,q'\,e+)$$

$$\tilde{q}\,\tilde{q} \to (q\ \tilde{\chi}_1^0)\ (q\,\tilde{\chi}_1^0) \xrightarrow[\text{RPV}]{} q\,(q'\,q''\,e+)\ q\,(q'\,q''\,e+)$$

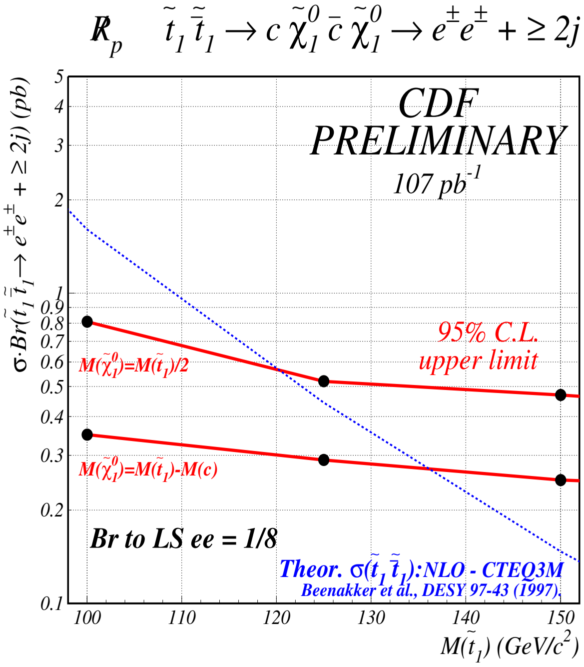
Assume: **RPV only for $\tilde{c}_L$ Br($\tilde{q} \to q\ \tilde{\chi}_1^0$) = 100 %**

Lepton number violating (LSP) decays:

$$\tilde{\chi}_1^0 \to e+\ c\ \bar{d},\ e-\ \bar{c}\ d,\ \text{and}\ \nu_e\, c\,\bar{u},\ \text{or}, \bar{\nu}_e\, \bar{c}\, u$$

Equal rates assumed -> Br(LS ee) = 1/8

$$M(\tilde{\chi}_1^\pm) > M(\tilde{q}) > M(\tilde{\chi}_1^0)$$



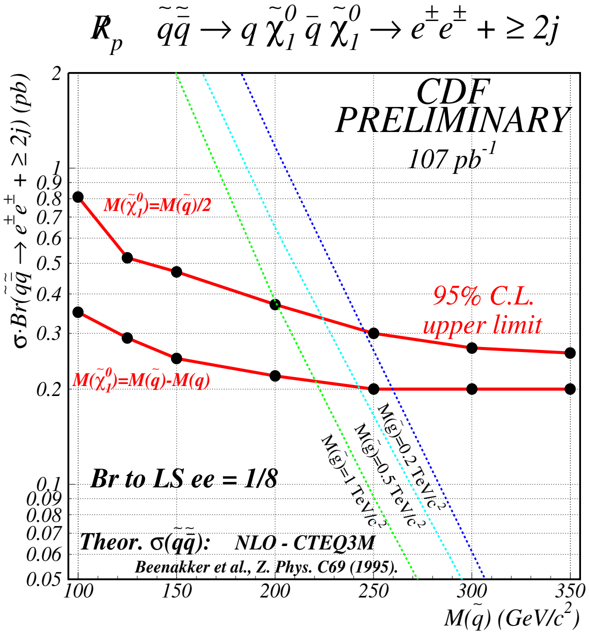
RESULTS:

σ Br upper limit for 2 m($\tilde{\chi}_1^0$)
Sensitivity limited to max.
m($\tilde{t}_1$) = 135 GeV/c^2

sensitivity substantially increased:

m($\tilde{q}$) > 200 or 260 GeV/c ^{2}

m($\tilde{g}$) & m($\tilde{\chi}_1^0$) dependant.



D0 SEARCH for RPV SUSY in DIELECTRON CHANNEL

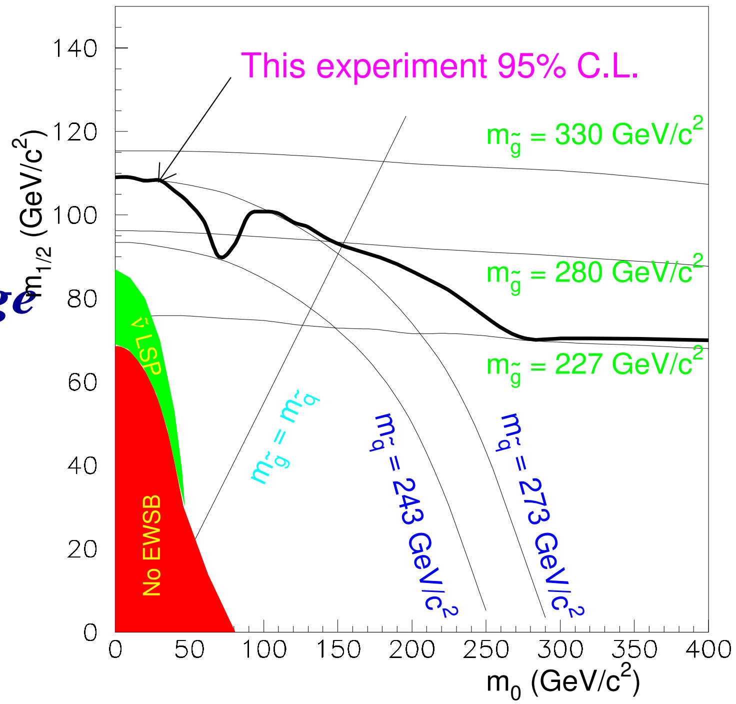
$\Leftrightarrow$ search for ee + 4 or more jets events @ L=99pb-1

Assumed: mSUGRA with λ'_{1jk} (j=1,2 and k= 1,2,3)

$A_0 = 0, \mu < 0, tg\beta = 2$

Selection:

- At least 2 e's with Et> 15 (10) GeV
- At least 4 jets with Et > 15 GeV , in $|\eta| < 2.5$
- m(ee) not in [76 - 106] GeV Z mass range
- Ht = Sum (Et) in $|\eta| < 2$, is >150 GeV



Backgrounds: DY -> ee, Z -> $\tau\tau$ -> ee
tt -> ll -> ee, Instrumental

Remark:

When tg β increases this analysis shows that the sensitivity to this selection decreases. So need to modify requirements: less on e's and ask Etmiss.

RESULTS:

Observed: 2 evts, expected: 1.8 +or- 0.4

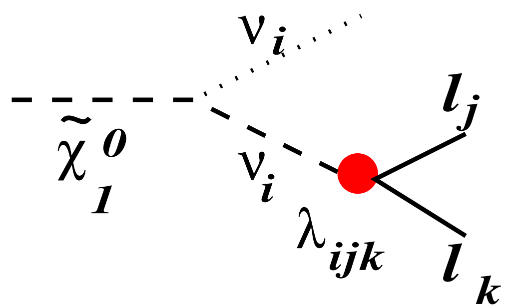
M(squark)>243 GeV & M(gluino)>227 GeV

If degenerated in mass: M > 277 GeV

SEARCH FOR NEUTRALINO at CDF

<-> RPV pair produced neutralinos -> 4 leptons

$p\bar{p} \rightarrow \tilde{\chi}^0_1 \tilde{\chi}^0_1 \rightarrow l\,l\,l\,l + X$



Assumed mSUGRA with $A_0 = 0$, $tg\,\beta = 2$

Perform scan in M_0, $M_{1/2}$ $\mu < 0$,

Only λ'_{121} different from 0

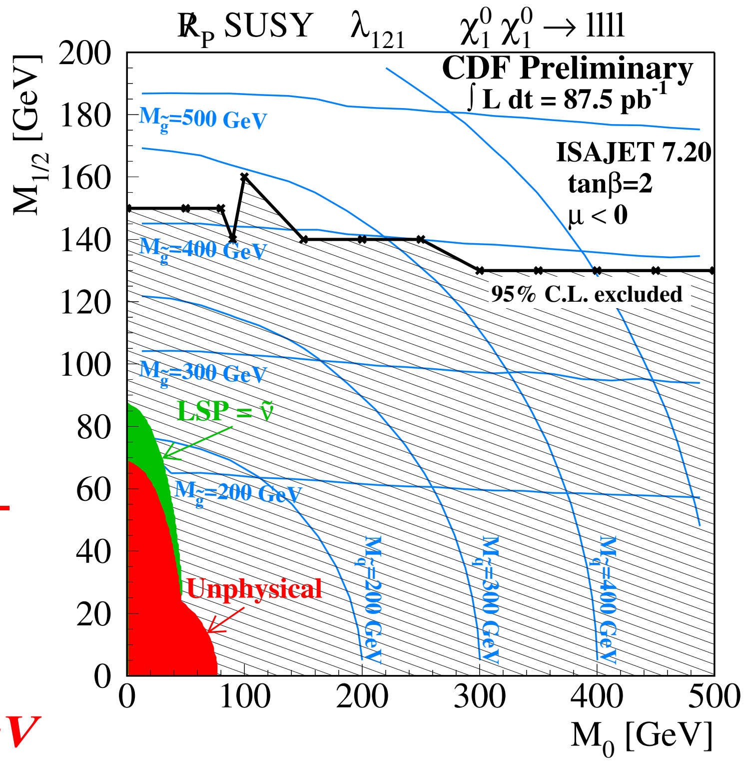
LSP must decay promptly to be observed

Selection: L = 87.5 pb-1

- *lepton 1, central, Pt > 12 GeV/c*
- *leptons 2,3,4, Pt> 5 GeV/c*
  (lepton =e or muon)
- *leptons separated by $\Delta R > 0.4$*

Backgrounds: Instrumental, bb, cc

RESULTS: ->



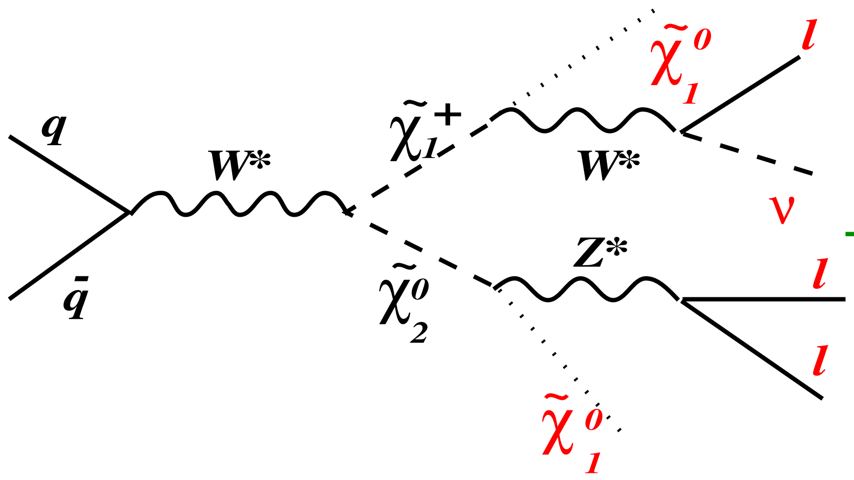
1 event observed (see next!)

expected: 1.3 + or - 0.4

- *$M_{1/2}$ > 130 GeV, m(squark)>360 GeV*
- *m(gluino)>380 GeV, m(neutralino)>55 GeV*

SEARCH for $\tilde{c}^{+}_{2}\,\tilde{\chi}^{0}_{1}$ PRODUCTION @ CDF/D0

→ golden trilepton susy-signature



→ 3 leptons +Etmiss

Both CDF (106 pb-1) and D0 (90 pb-1) searched for eee, eeμ $\mu\mu$ e, $\mu\mu\mu$ events in RUN I.

Selection:

- > 2 leptons (e or muon) with varying Et
- require e+ e- or $\mu^+\mu^-$ (CDF only)
- |Q1+Q2+Q3|<3 (CDF only)
- ΔR(ll) >0.4 (lepton separation)
- lepton-lepton correlation
- resonance removal (Z, Υ, J/Psi)
- Etmiss >10-15 GeV

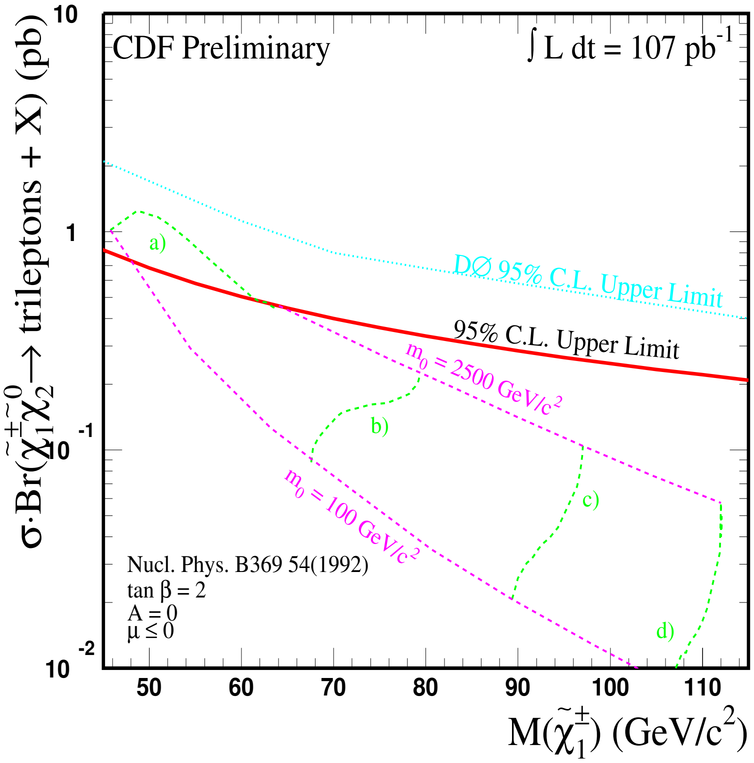
Bkgds:

WZ, ZZ
Zb, Wbb
top pair
Z/γ +
fake leptons

NO EVENT OBSERVED IN EITHER EXPERIMENT
EXPECTED BKGD EVTS IS: 1.2 +or- 0.2 (CDF)
1.3 +or- 0.4 (D0)

TYPICAL EFFICIENCY : 3-12 % (CDF), 2-6% (D0)
when m($\tilde{\chi}_1^{\pm}$) is varied from 50 to 100 GeV

Results interpreted in MSSM models ($tg\ \beta$ =2, A_0=0, μ <0) which give: m(chargino 1) ~ masse(neutralino2) ~ 2 x masse(neutralino1)



RESULT, IF:

M(squark) ~ M(gluino)

μ = -600 GeV

M(chargino)>81.5GeV

In progress at CDF:

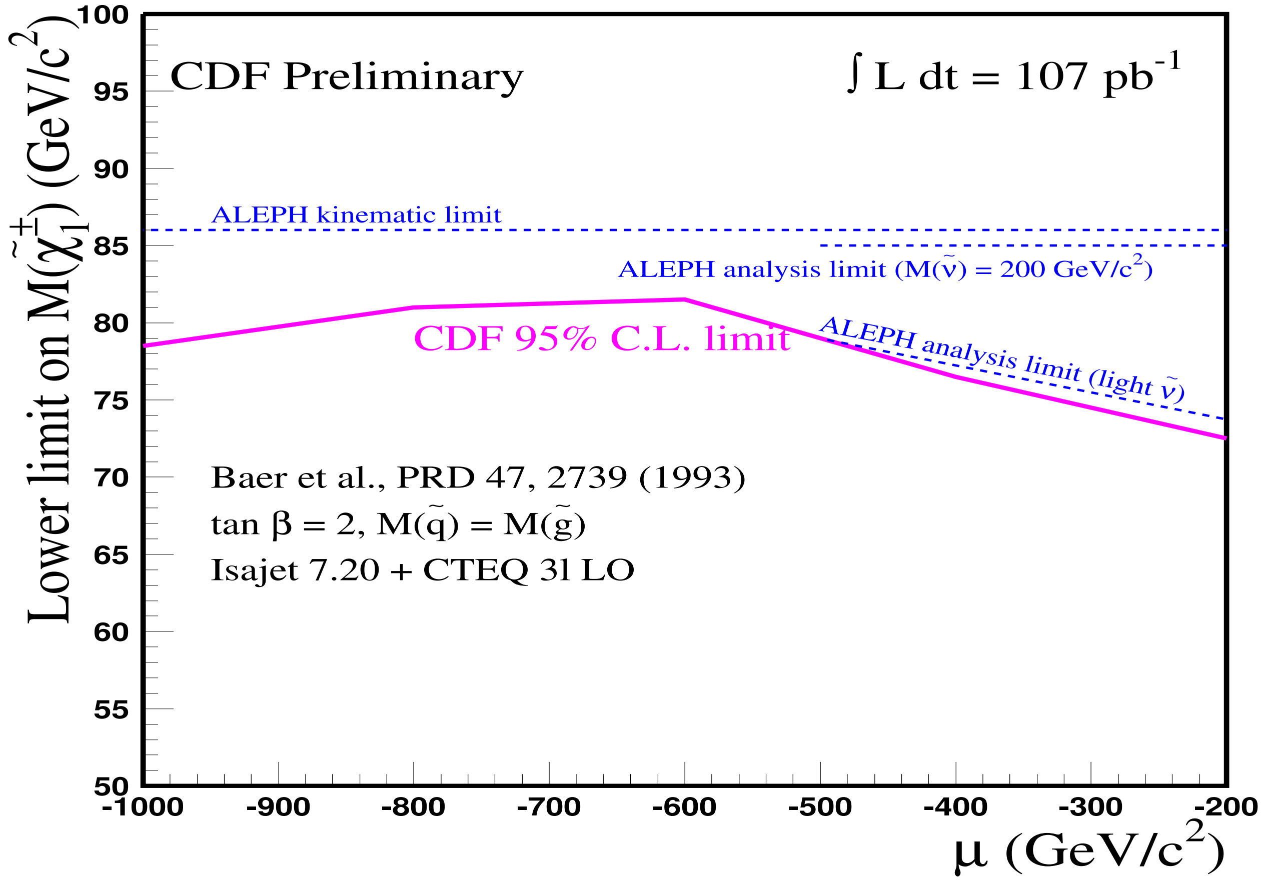
- ***Search for LS signature instead of trileptons (relax requirements on lepton identification and low SM backgrounds)***
- ***Search for τ signatures especially for higher $tg\ \beta$***

SO extended reach as the efficiency increases from [5% - 7.5%] to [7.5% - 11%] in the mass range 75 to 130 GeV so 50% better or more. And Backg decreases to 0.5 evt @ 100 pb-1

Comparison between TEVATRON and LEP limits on chargino mass:

For μ = - 600 GeV

chargino mass limit = 81.5 GeV @ TEVATRON



PHOTON ENRICHED SUSY:
search for 2 photons Etmiss events at D0

Selection: L=106 pb-1

- $\gamma_{1,2}$ ***with Et>20,12 GeV in central or end cap calos.***
- ***Etmiss > 25 GeV***

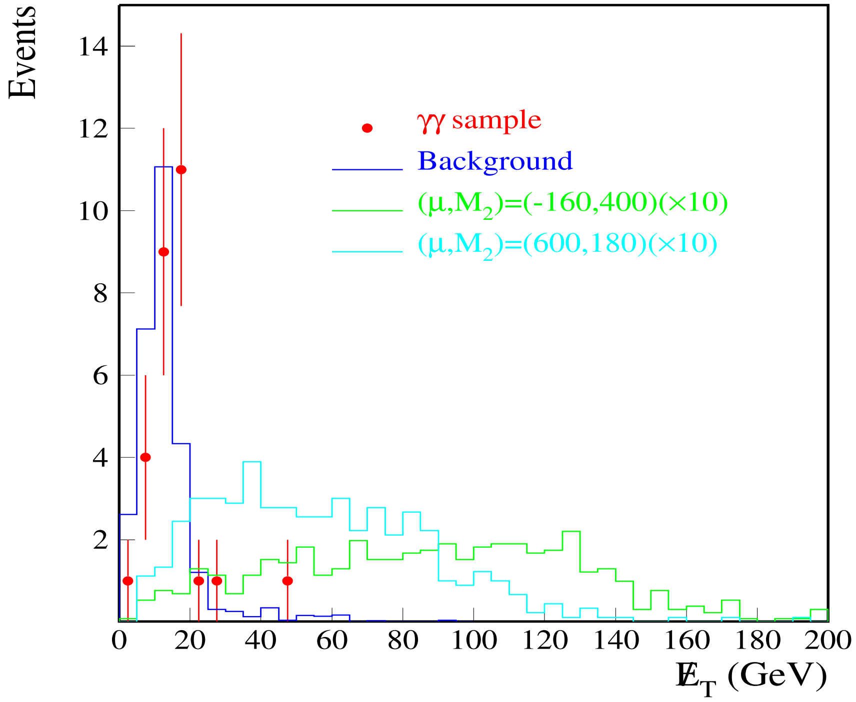
Backgrounds:

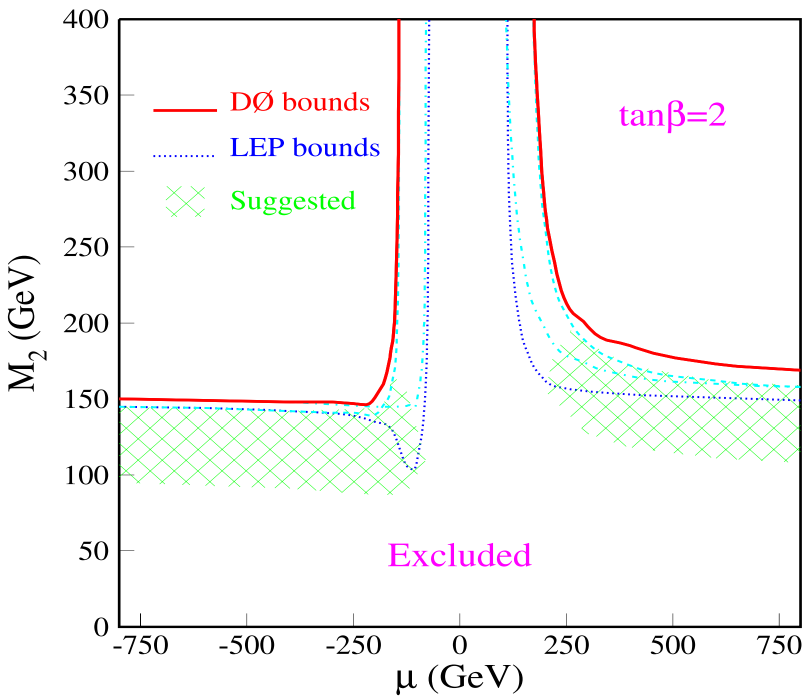
Multijet, direct γ***,*** $W\gamma$ ***,*** $W+$***jets,*** $Z \to ee$

Search triggered by ee $\gamma\gamma$ ***Etmiss CDF event.***

IF: $\tilde{G}$***=LSP and*** $\tilde{\chi}_1^0 \to \gamma\,\tilde{G}$

- $pp \to \tilde{\chi}_i\,\tilde{\chi}_j \to \tilde{\chi}_1^0\tilde{\chi}_1^0 + X \to \gamma\,\gamma\,\tilde{G}\tilde{G} + X$





observed: 2 events, expected: 2.3+-0.9

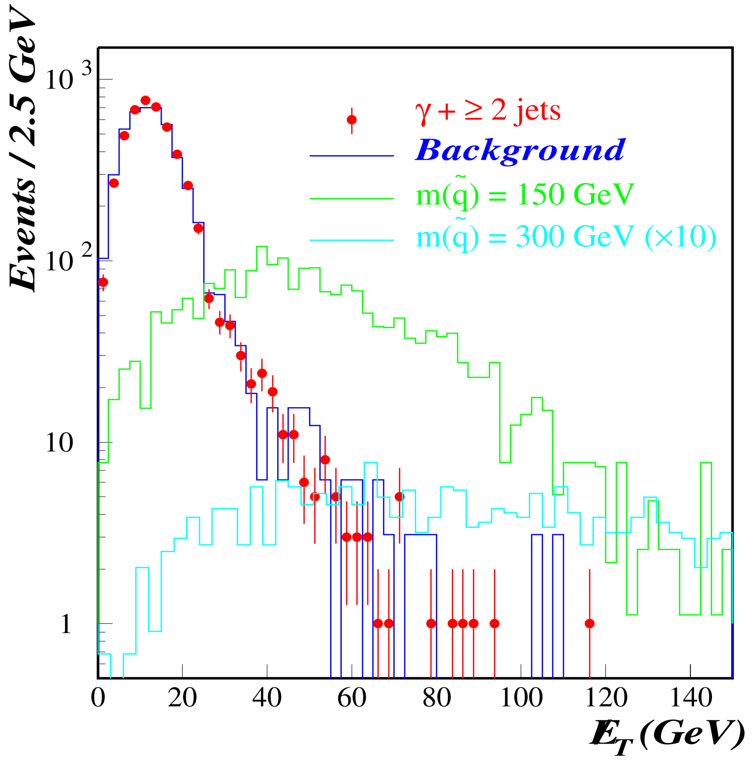
m(chargino) >150 GeV @ 95% C.L.

Search for single photon+Etmiss+>1 jet at D0

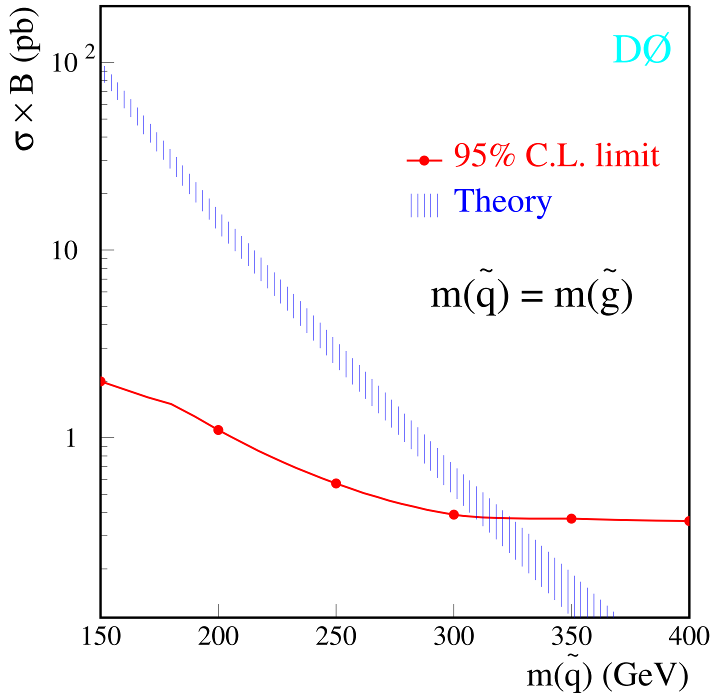
Selection: L = 99 pb-1

- *photon with Et > 20 GeV in central or end caps calo.*
- *More than 1 jet with Et>20 GeV, in central or end caps calo.*
- *Etmiss > 45 GeV (Ht> 220 GeV)*

Same backgrounds as for diphoton case



Interpreted as squark/gluino prod. with : $\tilde{\chi}^0_2 \rightarrow \tilde{\chi}^0_1 + \gamma$ dominant



m(squark)> 310 GeV ($m_{\tilde{q}} = m_{\tilde{g}}$)

m(squark)>240 GeV (heavy gluino)4 0 4 0 0 2

m(gluino)>240 GeV (heavy squark)4 0 4 0 0 2

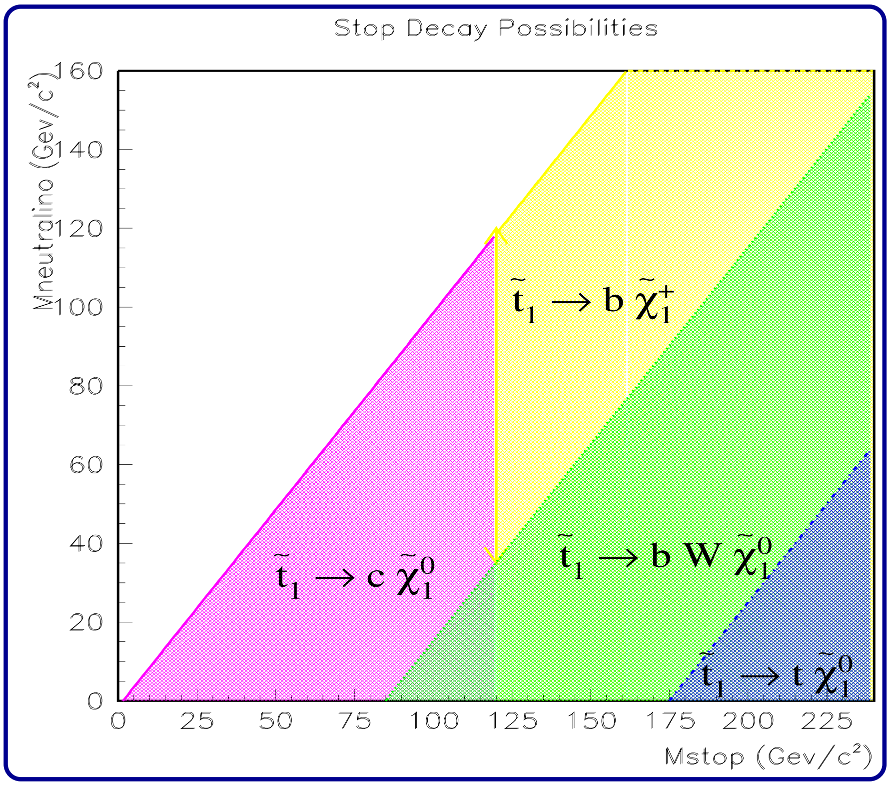
SEARCH FOR THIRD GENERATION SQUARKS

STOP PRODUCTION

- stop can be the LIGHEST squark because high top mass and large Yukawa coupling
- stop produced in gg and qq fusion
- $\sigma\,(p\bar{p} \to \tilde{t}_1 \tilde{t}_1)$ depends only on $m(\tilde{t}_1)$

SBOTTOM PRODUCTION

- For $tg\,\beta > 10$, large $\tilde{b}_L - \tilde{b}_R$ mixing can lead to $\tilde{b}_1$ is the lighest squark.



SBOTTOM SEARCH at D0

→ sbottom -> b plus neutralino

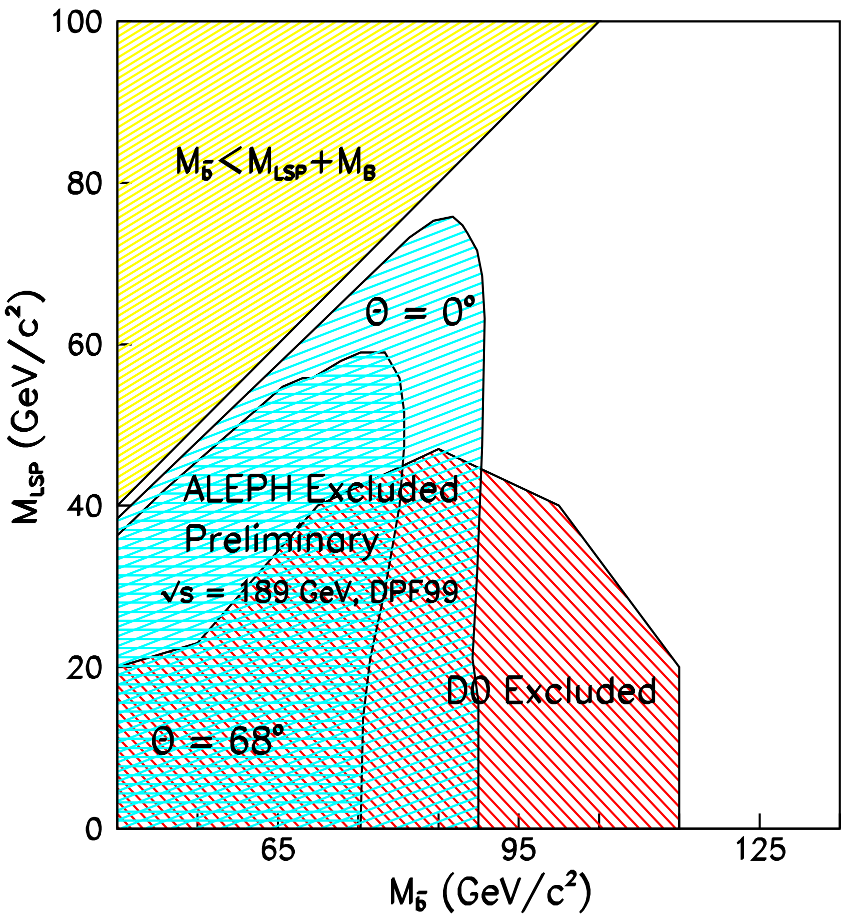
⇛ signature: jets + Etmiss

SELECTION:

- 2 jets with Et > 30 GeV
- 1 jet with associated muon to tag b.
- Etmiss > 40 GeV
- $\Delta\Phi$ (Etmiss, jet)>0.7

RESULT:

observed: 5 events
expected: 6.0 + or - 1.3

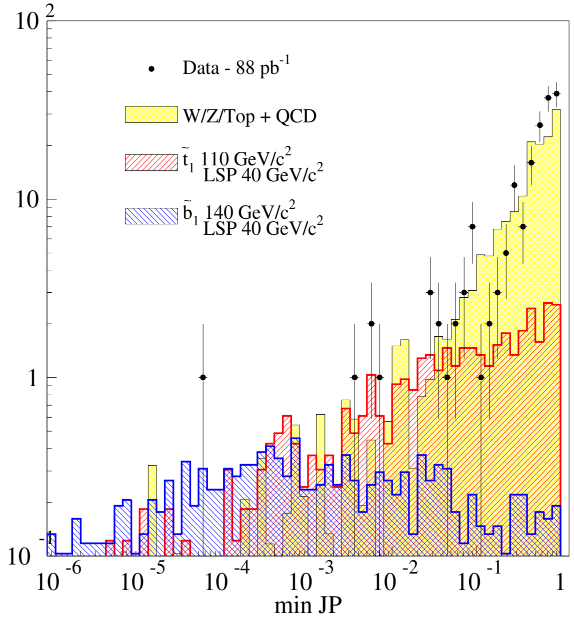


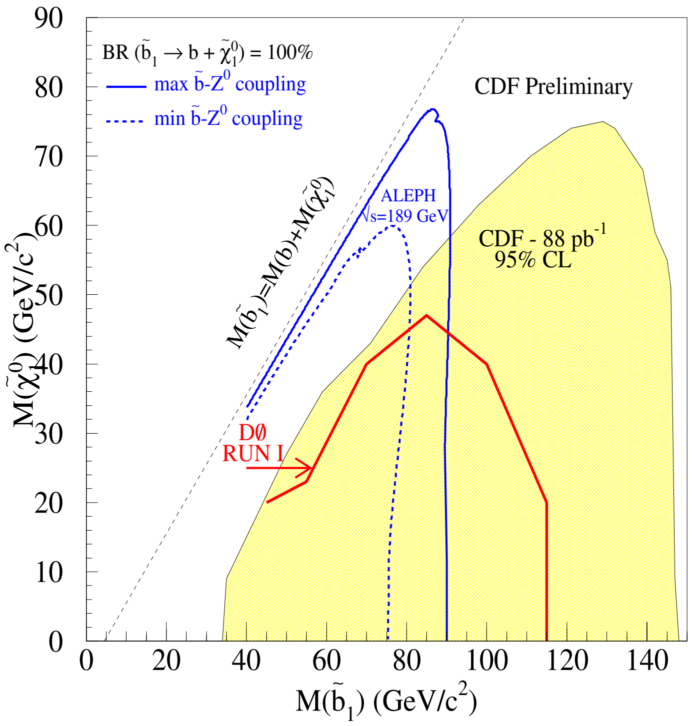
Sbottom search at CDF @ L = 88 pb-1

signature= 2 bottom jets + Etmiss

Selection (also applies to stop into charm + neutralino)

- *pretagged sample (basic cuts)*
  - 2 or 3 jets with Et>15 GeV, $|\eta|<2$
  - Etmiss > 40 GeV
  - veto extra jets with Et > 7 GeV, $|\eta| < 3.6$
  - veto extra leptons
  - min $\Delta\Phi$ (Etmiss, jet)> 45^0 ; $\Delta\Phi$ (Etmiss, j1)<165^0 ; $45^0 < \Delta\Phi$ (j1,j2)<165^0
- *heavy flavour tagging*
  - Jet proba algo. to tag b's (using microvertex)
  - cut optimized for c & b selection <5(1) % for stop (sbot.)
  - efficiency tested on heavy enriched samples





RESULTS: observed 5, expected 5.8 + or - 1.8
M(sbottom) > 145 GeV/c^2

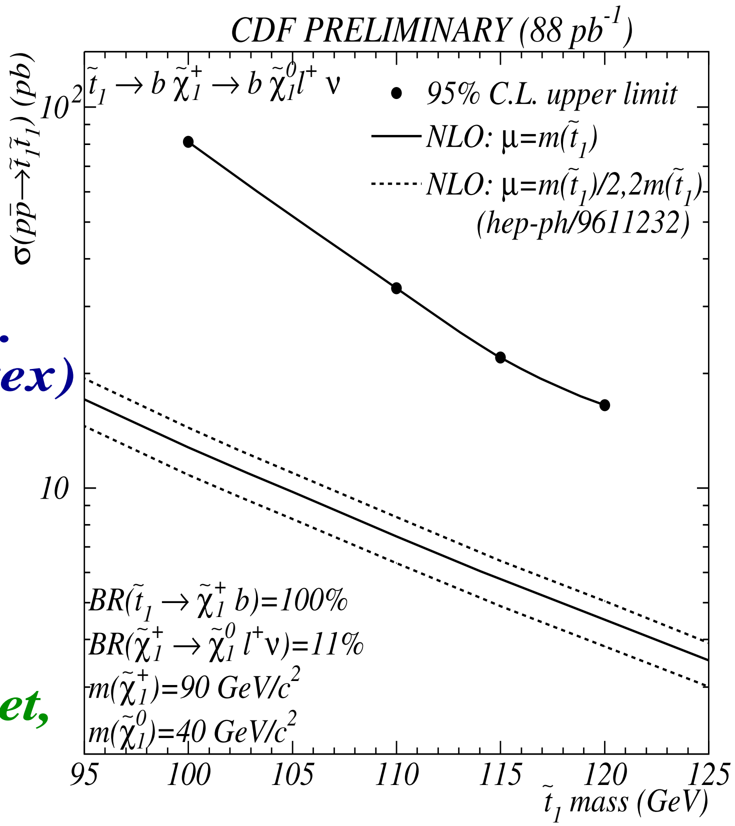
SEARCH FOR STOP -> bottom+chargino at CDF

signature: b-tag + lepton + Etmiss

Search for stop -> b + chargino and chargino -> neutralino + lepton + neutrino

Selection:

- **central lepton, Pt > 10 GeV/c**
- **2 or more jets with Et > 8 GeV**
- **Etmiss > 25 GeV,**
  $\Delta\Phi$ (Etmiss,jet) > 0.5
- **SECVTX b-tag**
  (selects tracks with significant i.p. inside a given jet => secondary vertex)
- **BR($\tilde{\chi}_1^+ \rightarrow \tilde{\chi}_1^0$)= 11%**



Backgrounds:

cc, bb, tt, (W-> $l\,\nu_l$) + > 1 jet, γ -> l+l-
(Z -> $\tau+\tau-$) + > or = 1 jet, (Z -> l+l-) + > 1jet,
$t\,\bar{b}$ from W-g fusion, fakes.

RESULTS:

OBSERVED = 81 events
EXPECTED = 86.2 +or- 5.2

SEARCH FOR STOP into bottom + lepton +sneutrino at CDF

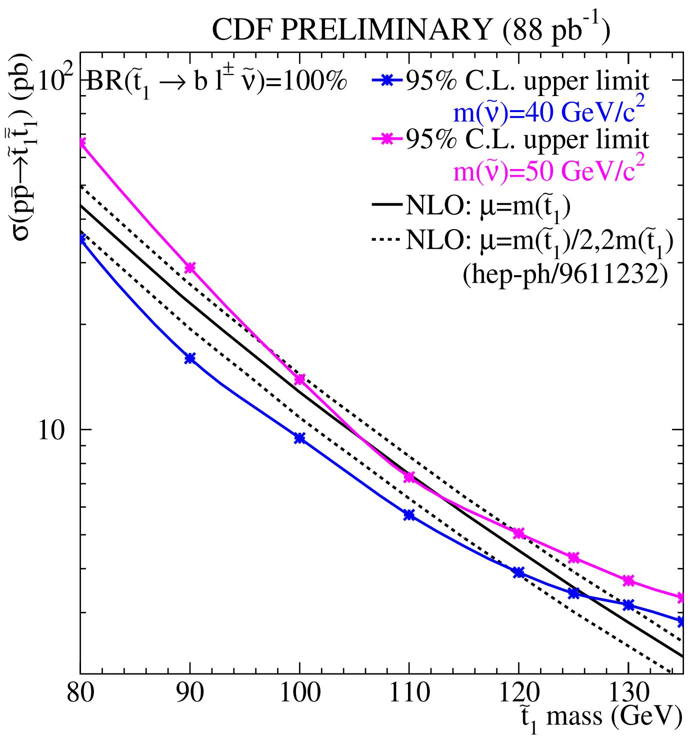
→ **signature b-tag + lepton + Etmiss**

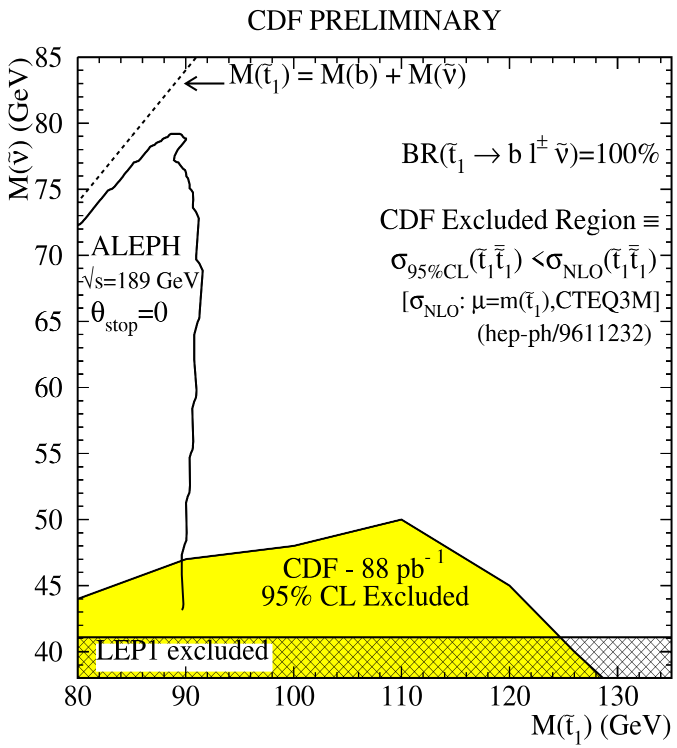
This decay dominates if the sneutrino is light and the decay of the stop into bottom plus chargino is not kinematically allowed

The selection is the same as for the deacy into bottom plus chargino, but assumed an equal BR to e, muon and τ

RESULTS:

observed = 81 and expected = 86.2 +or- 5.2





SEARCH FOR TOP DECAY INTO STOP & NEUTRALINO

stop decaying into bottom + chargino

leptons + bottom jets + jets + Etmiss signature

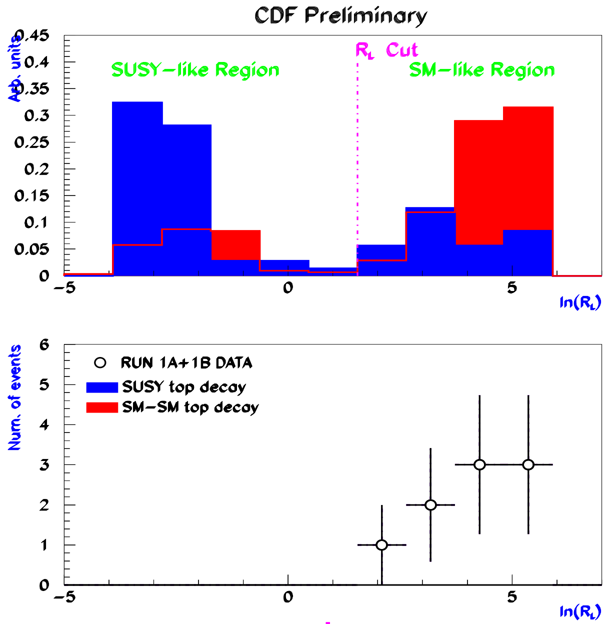
Main background:

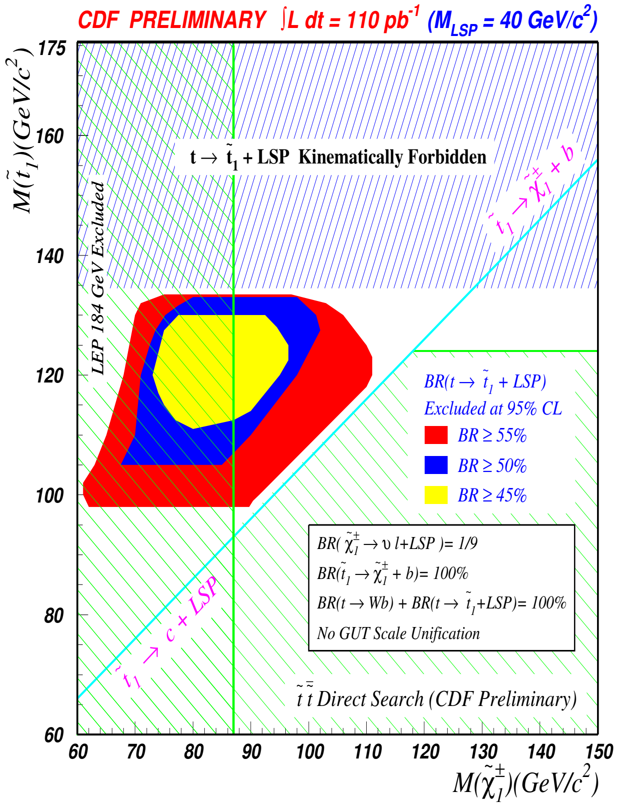
tt -> Wb Wb with semi leptonic or hadronic decay of b's as the chargino

Apply likelyhood method using the Et of

2nd and 3rd highest Et jet in the event

Result: All 9 evts on the S.M. side

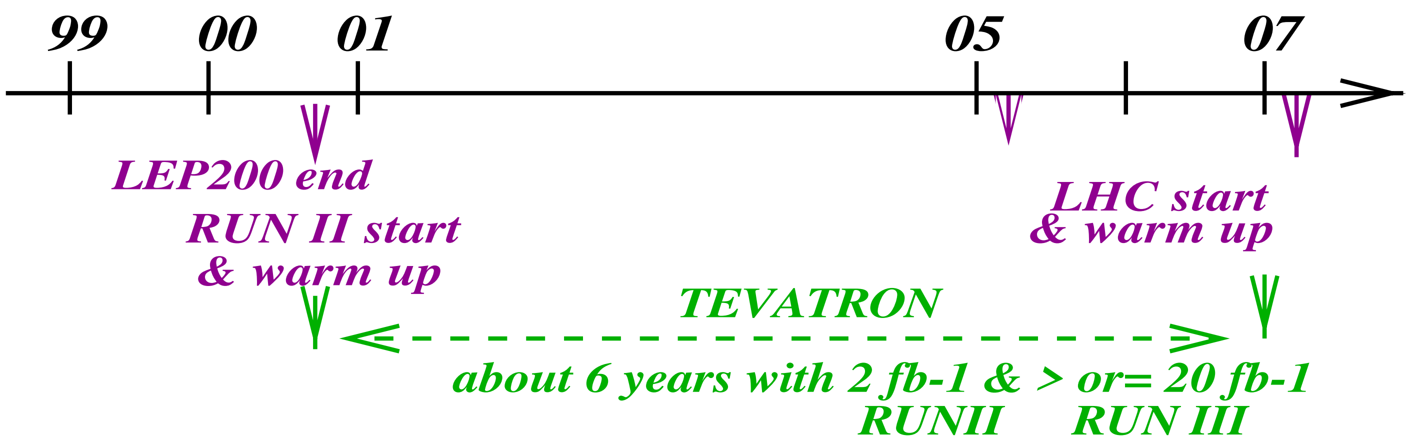




Exclusion contour

RUN II -TEVATRON: a unique window in mass range
a unique opportunity between
LEP 200 & LHC...

Schedule:



MAJOR IMPROVEMENTS

→ *The MACHINE: NEW MAIN INJECTOR, No more main Ring!*

c.m.s energy: 1.8 TeV to 2 TeV => cross-sections X 1.2 to 2!

LUMINOSITY INCREASE: X 20 then X200

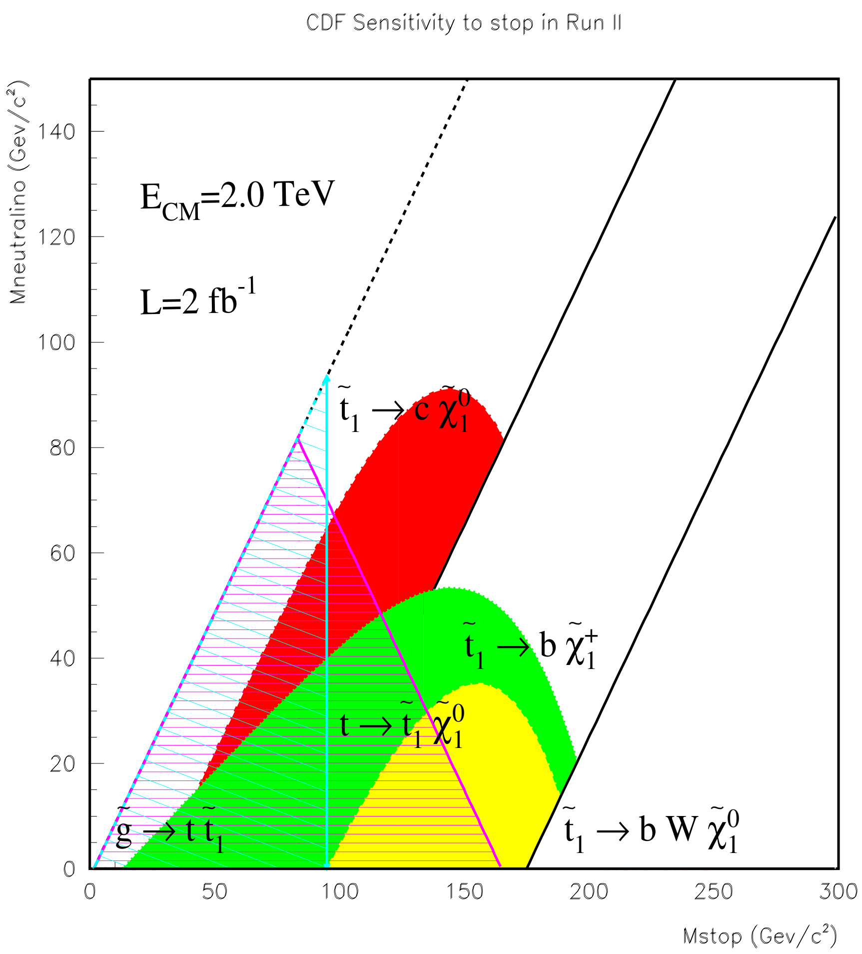
→ *The DETECTORS: Both CDF and D0 are undergoing through VIGOROUS UGRADES:*

Calorimetry (CDF), Muons (CDF), Tracking (CDF/D0), F.E. & readout electronics (CDF/D0), Trigger (CDF/D0), DAQ (CDF/D0)

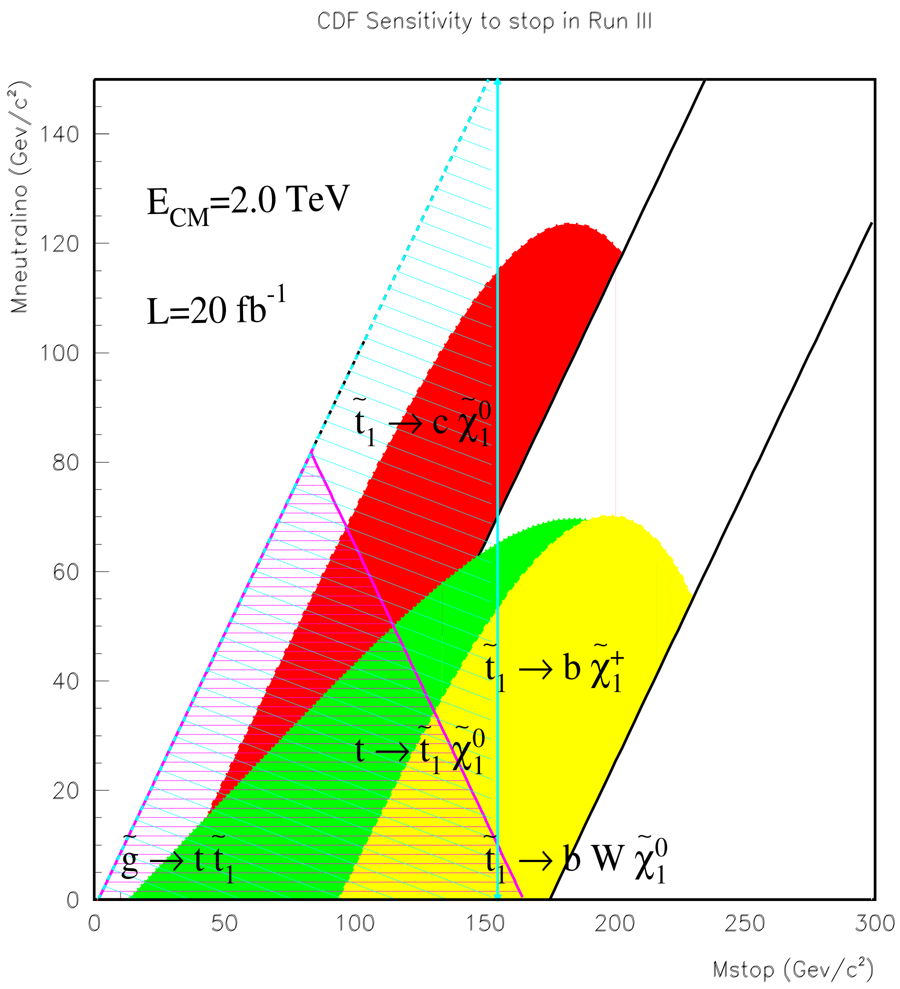
MAJOR ISSUES: TRACKING (microvertex to external tracking) & TRIGGERING (LV1 to LV3, realtime !!)

BONUS: EXPERIENCE GAINED FROM RUN I!

PROSPECTS FOR STOP SEARCH in RUN II



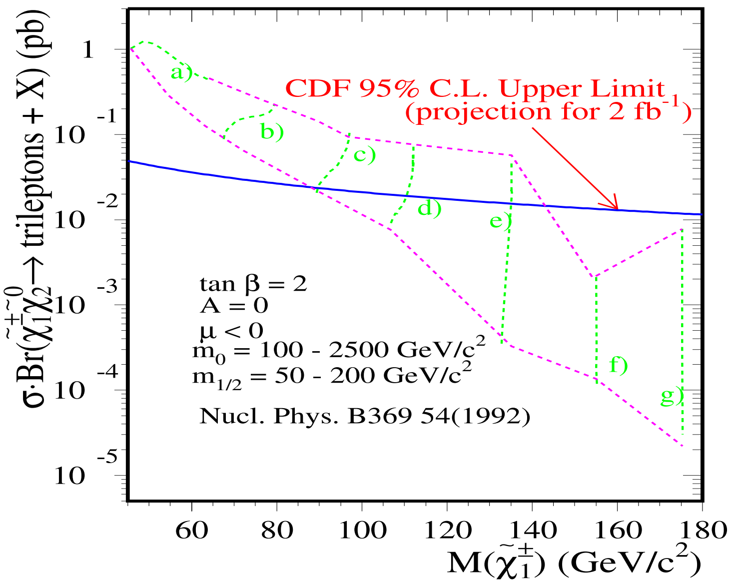
L = 2 fb-1

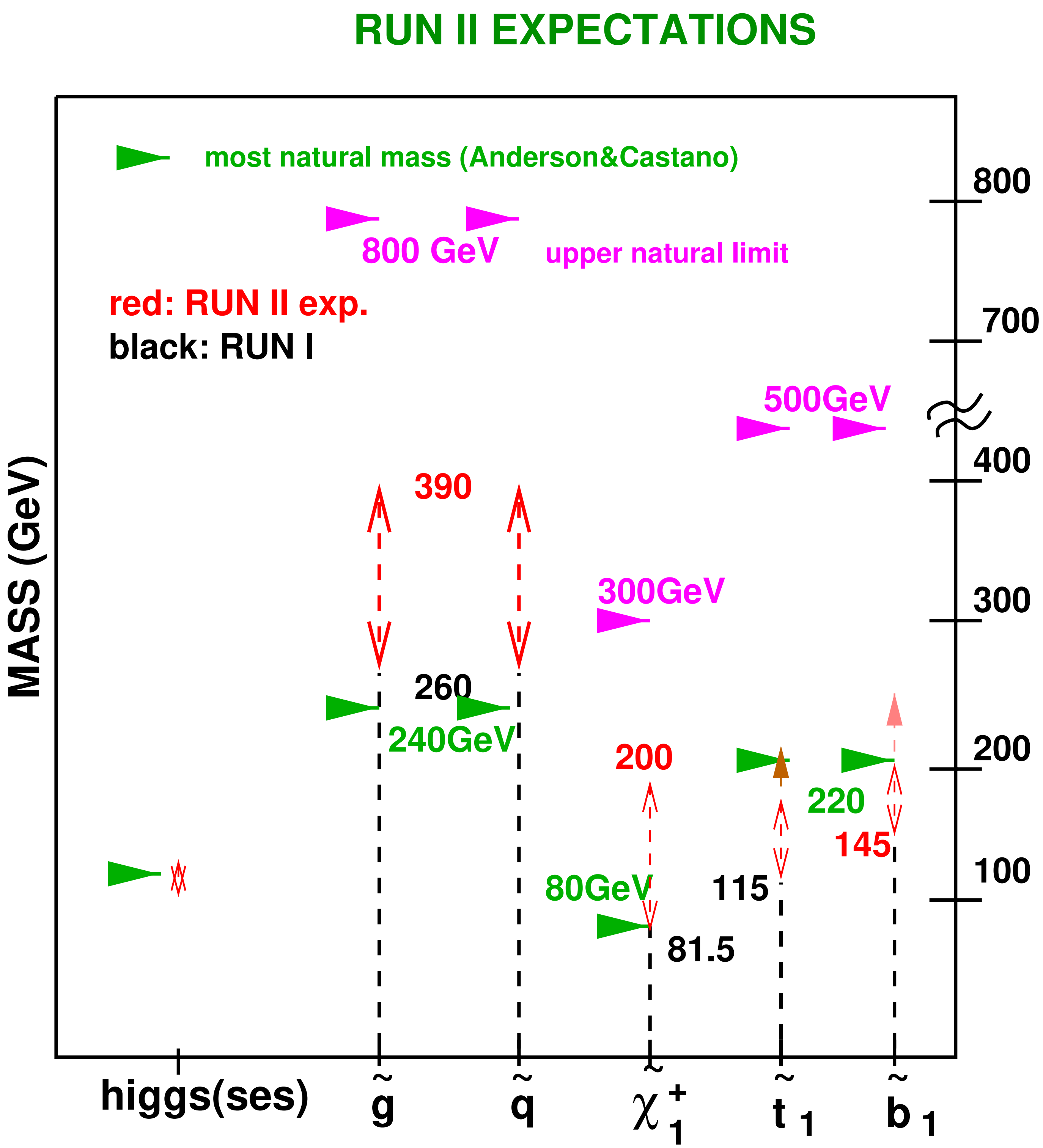


L = 20 fb-1

PROSPECTS FOR RUN II (Cont'd)

Chargino mass limit prospect: up to 150 GeV @ L = 2 fb-1





RUN II EXPECTATIONS
most natural mass (Anderson&Castano)
800 GeV
upper natural limit
red: RUN II exp.
black: RUN I
500GeV
390
300GeV
260
240GeV
200
220
145
80GeV
115
81.5
MASS (GeV)
800
700
400
300
200
100
higgs(ses)

CONCLUDING REMARKS ....

RUN I at the TEVATRON has been marked by the TOP DISCOVERY

the demonstration that hadronic colliders can compete with lepton machines for the B-PHYSICS

AND

An impressive activity still going on to EXPLORE the BEYOND STANDARD MODEL

RUN II at the TEVATRON will be a UNIQUE OPPORTUNITY in the coming 5 -> 7 years to hopefully penetrate the SUSY-WORLD

in a crucial mass range both if

NOTHING ***A SIGN FOR SUSY***

so stay on line with us....