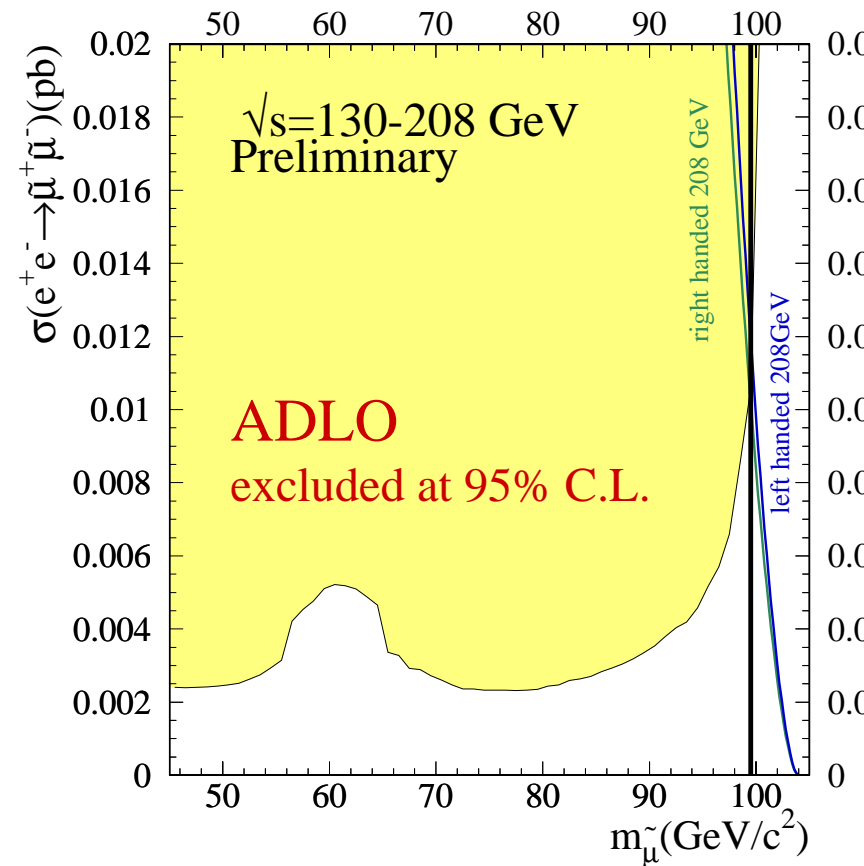
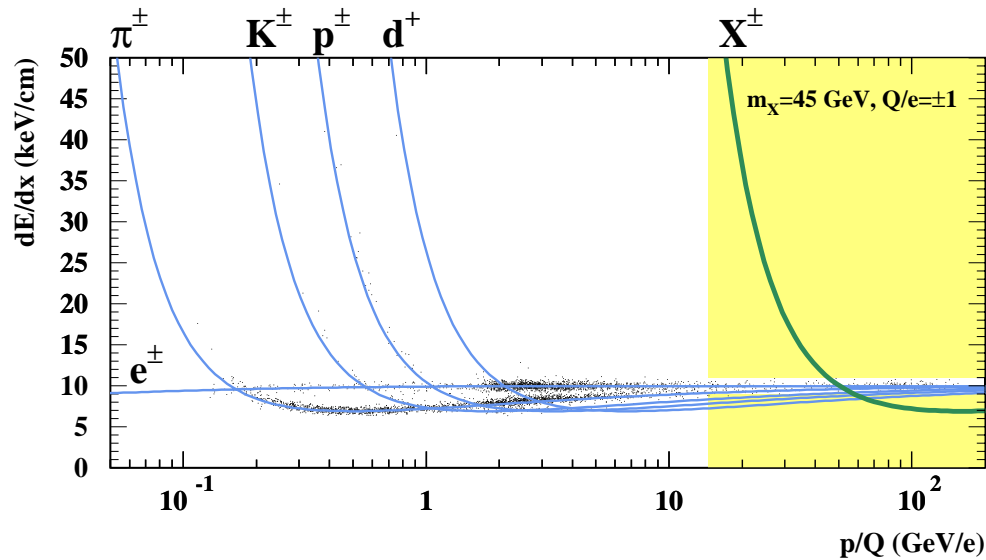


# Search for Heavy Stable Charged Particles – LEP SUSY WG

- Pair produced heavy stable charged particles.
  - ◇ Main tool: search for particles with anomalously high or low ionisation energy loss ( $dE/dx$ ) in the tracking chambers:



⇒ for right (left) handed  $\tilde{\tau}$ ,  $\tilde{\mu}$ :

$$m_{\tilde{\tau}, \tilde{\mu}} > 99.4 \text{ (99.6) GeV}/c^2$$

⇒ for stable charginos with  $m_{\tilde{\nu}} > 41$ . (500.) GeV/c<sup>2</sup>:

$$m_{\tilde{\chi}_1^\pm} > 101.5 \text{ (102.5) GeV}/c^2$$

# LEPSUSYwg: Interpretation in Minimal Supergravity

Model parameters:  $\tan\beta$ ,  $\text{sign}(\mu)$ ,  $m_0$ ,  $m_{1/2}$ ,  $A_0$

(from ISAJET 7.51)

Scans of  $(m_0, m_{1/2})$  planes for fixed  $\tan\beta$ ,  $\text{sign}(\mu)$ ,  $A_0$

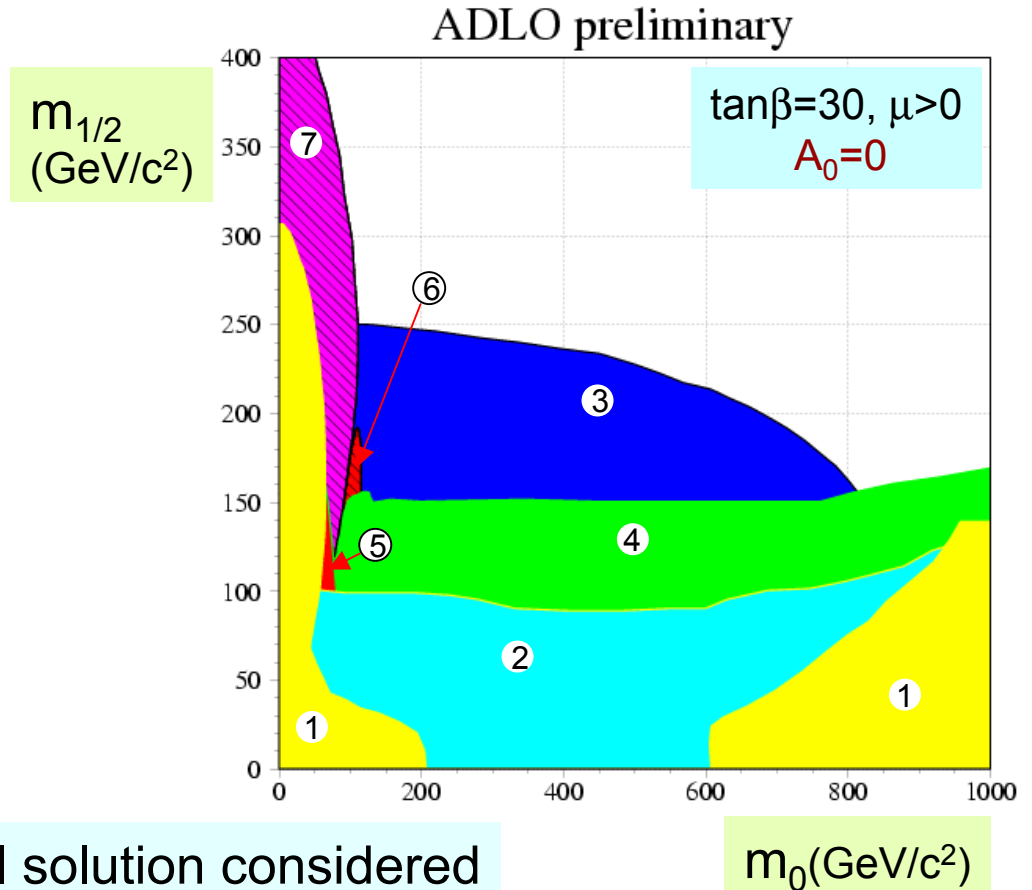
Example of excluded domains:

1. Theory forbidden
2. Z width
3. Higgs (hZ)
4. Charginos
5. Selectrons
6. Staus
7. Stable staus

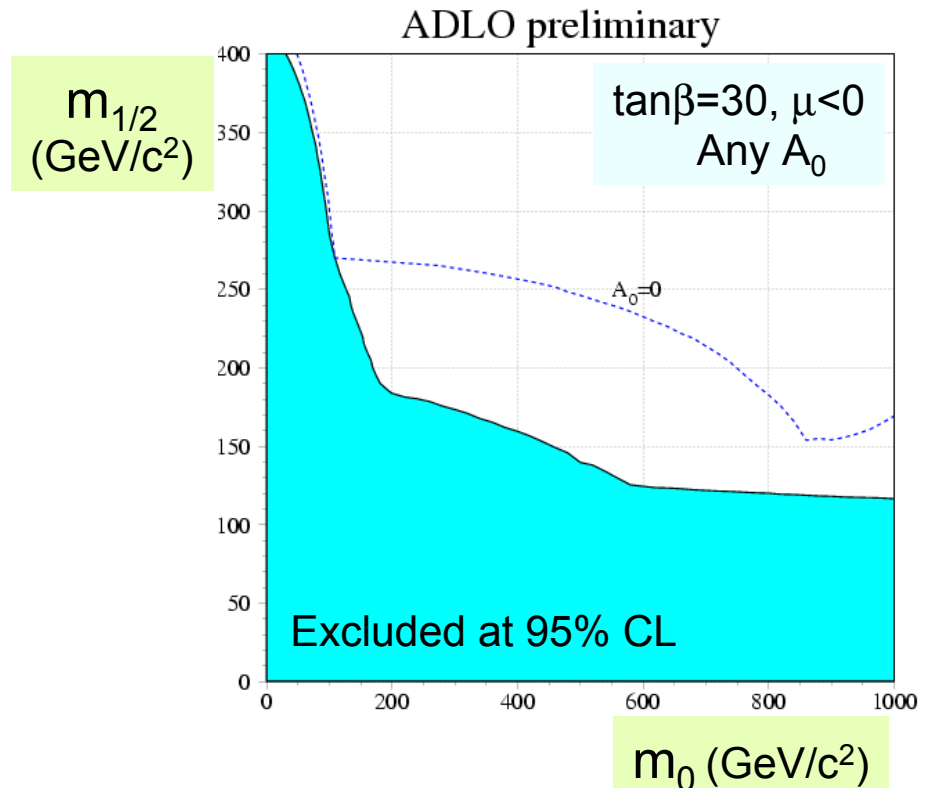
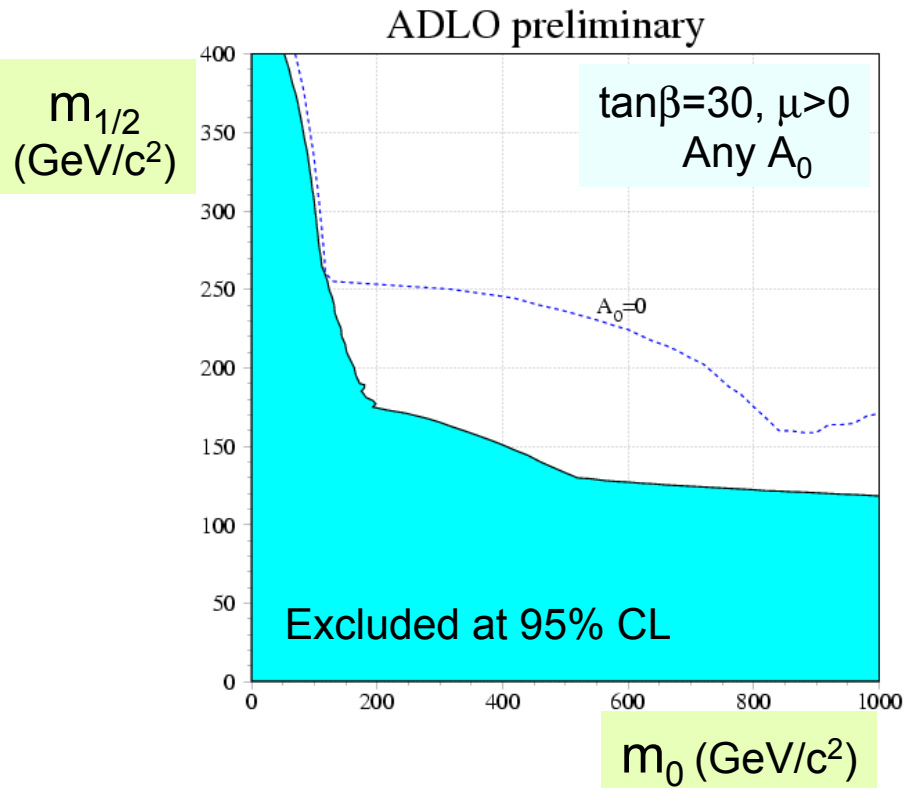
So far results given for  $A_0=0$

**NEW:**  $A_0$  scan

All  $A_0$  giving a consistent model solution considered



# LEPSUSYwg, mSUGRA: $(m_0, m_{1/2})$ planes



Light blue domains are excluded for any  $A_0$

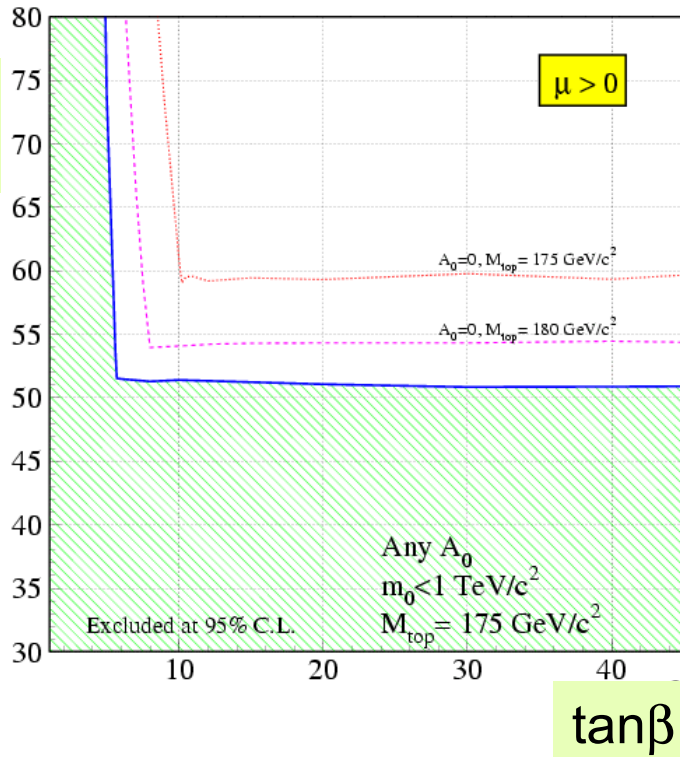
Weakest coverage found at large negative  $A_0$ :

e.g.  $A_0 \sim -0.5 \text{ TeV/c}^2$  ( $m_0 \sim 500 \text{ GeV/c}^2$ )  $\rightarrow$   $A_0 \sim -2 \text{ TeV/c}^2$  ( $m_0 \sim 1 \text{ TeV/c}^2$ )

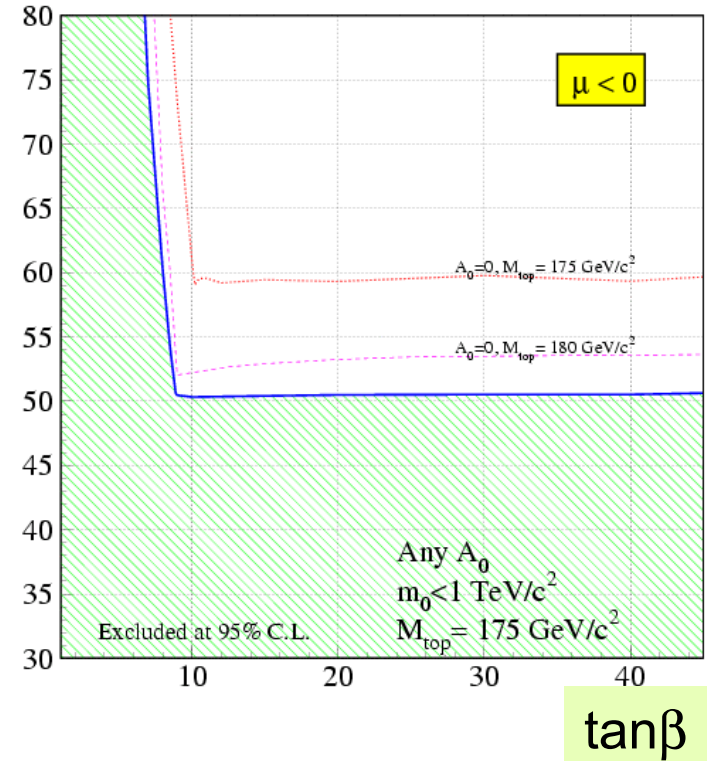
Same behaviour for both signs of  $\mu$

# LEPSUSYwg: LSP lower mass limit in mSUGRA

$M_{\text{LSP}}$   
(GeV/c<sup>2</sup>)



$M_{\text{LSP}}$   
(GeV/c<sup>2</sup>)



Lower limits  
on the LSP  
Mass (GeV/c<sup>2</sup>)

**PRELIMINARY**

$M_{\text{top}}$  (GeV/c<sup>2</sup>)

$\mu < 0$

$\mu > 0$

Any  $A_0$

175

50.3

50.9

$A_0=0$

180

52.0

53.9

175

58.6

59.0

More info in <http://lepsusy.web.cern.ch/lepsusy/> ⇒ LEPSUSYWG/02-06.2