

# Tevatron running in 2011?

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- Tevatron luminosity
- Physics topics
- Situation in D0: detector, manpower, finances
- Situation in D0 France

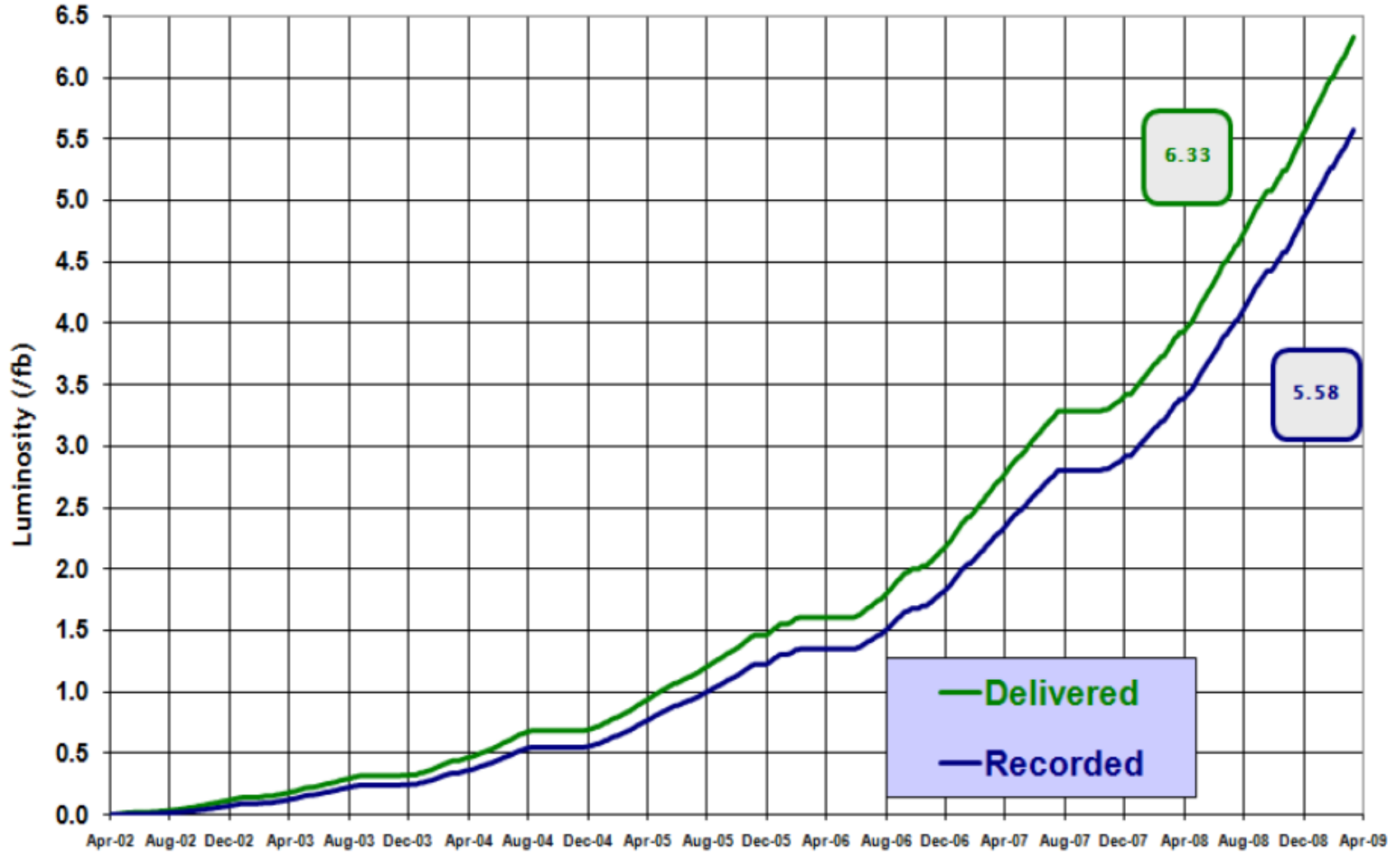
# D0 Luminosity

Luminosity collected by D0:  $\sim 5.6 \text{ fb}^{-1}$



## Run II Integrated Luminosity

19 April 2002 - 29 March 2009



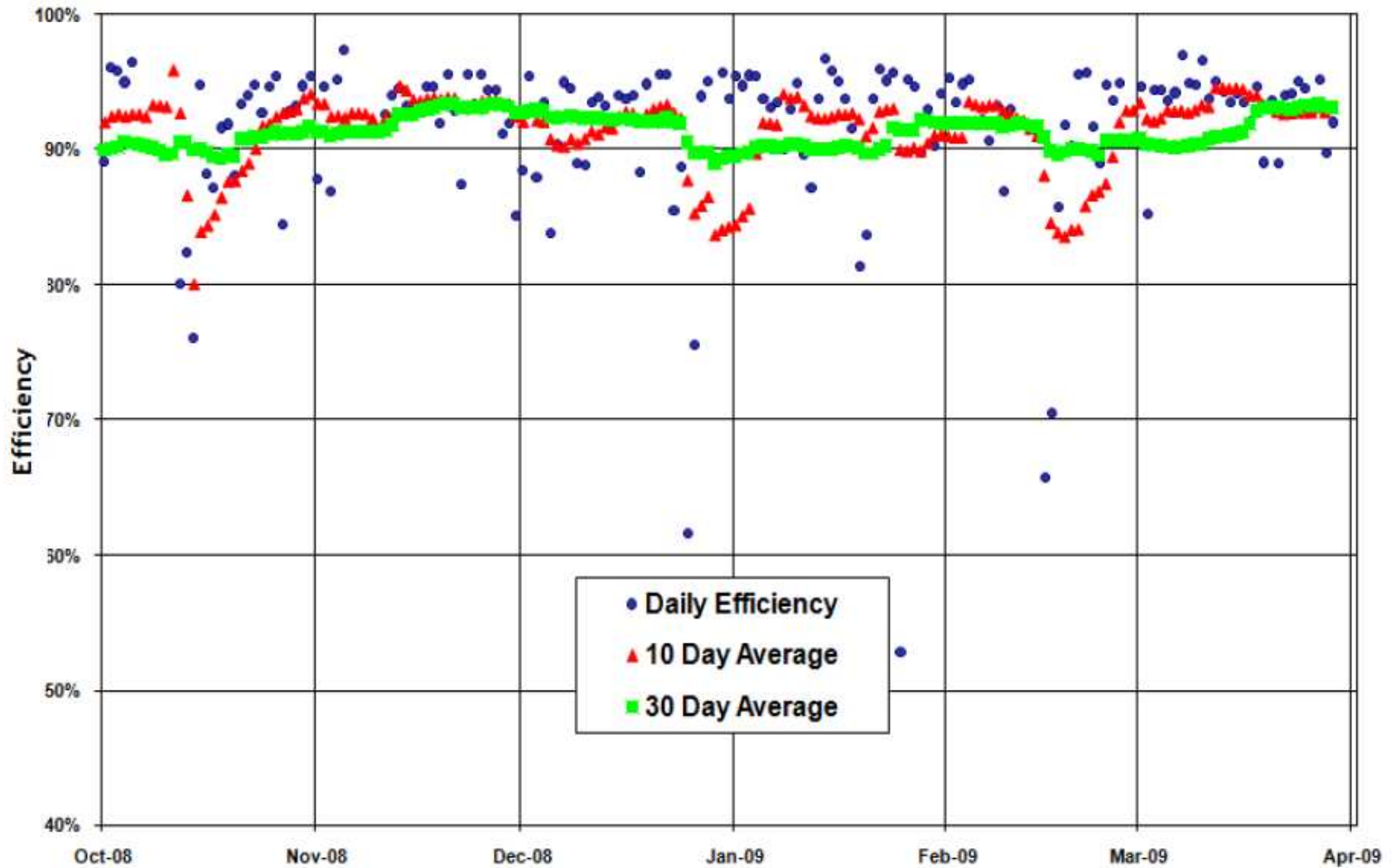
## D0 efficiency

Very good D0 efficiency: 92-94%



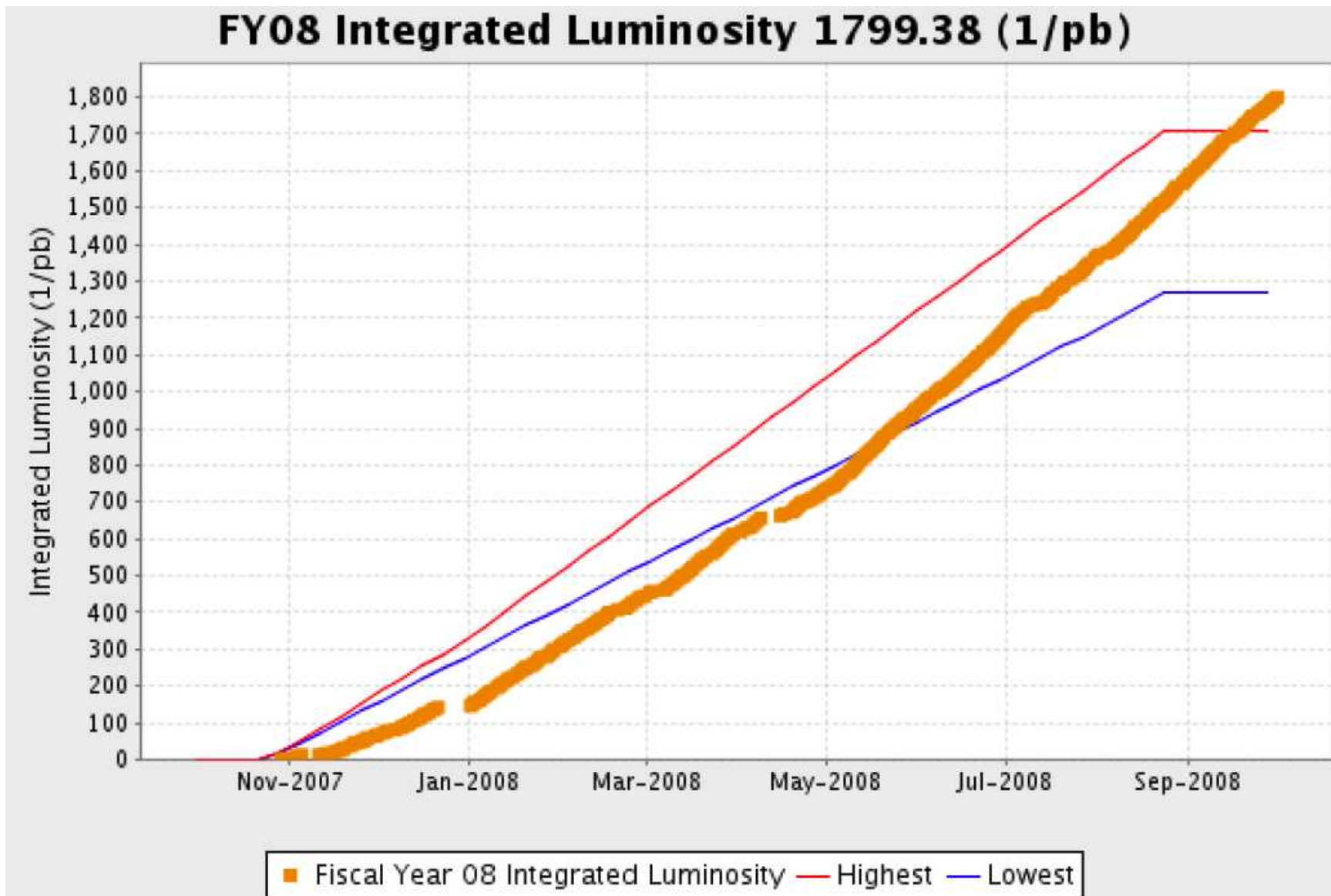
### Daily Data Taking Efficiency

FY09 through 29 March



## Tevatron luminosity

Recorded luminosity above highest expectations given to DOE



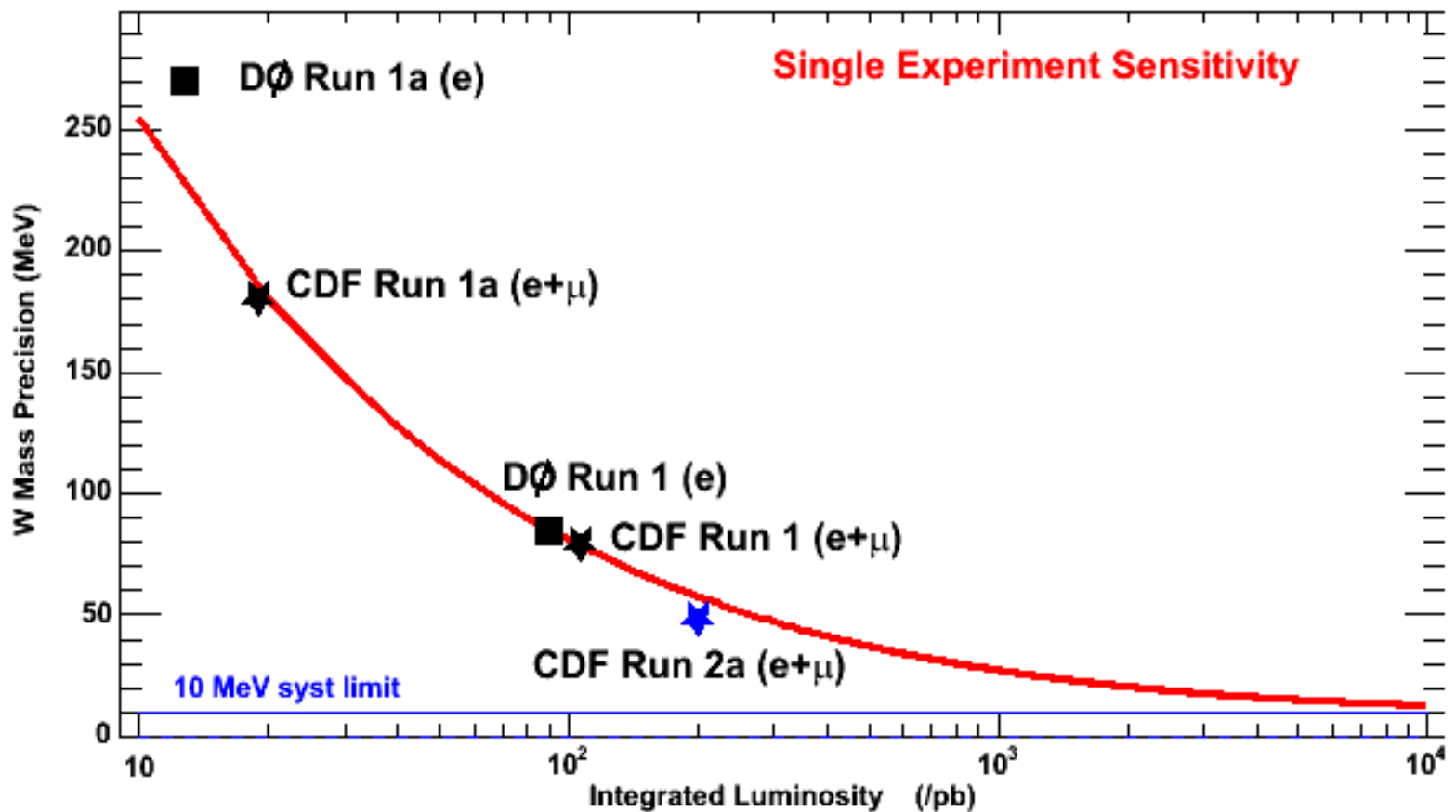
## Tevatron luminosity

2011: expect more than  $12 \text{ fb}^{-1}$  delivered, about  $11 \text{ fb}^{-1}$  recorded can be expected (Pier Oddone)



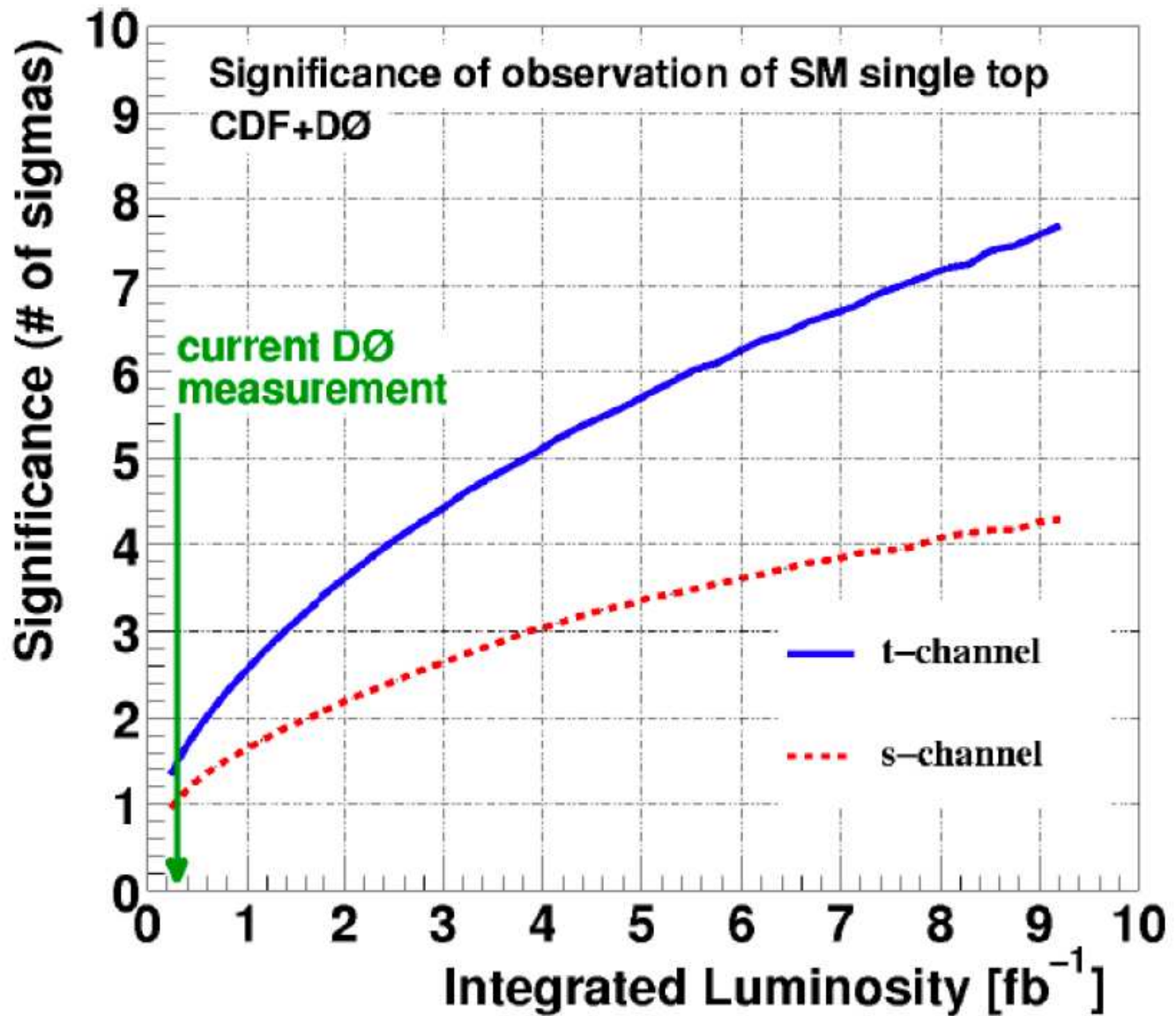
## A few physics examples: $W$ mass

- Precision on  $W$  mass: 44 MeV reached now, 20 MeV or better reachable? Difficult measurement at LHC
- Important for electroweak fits



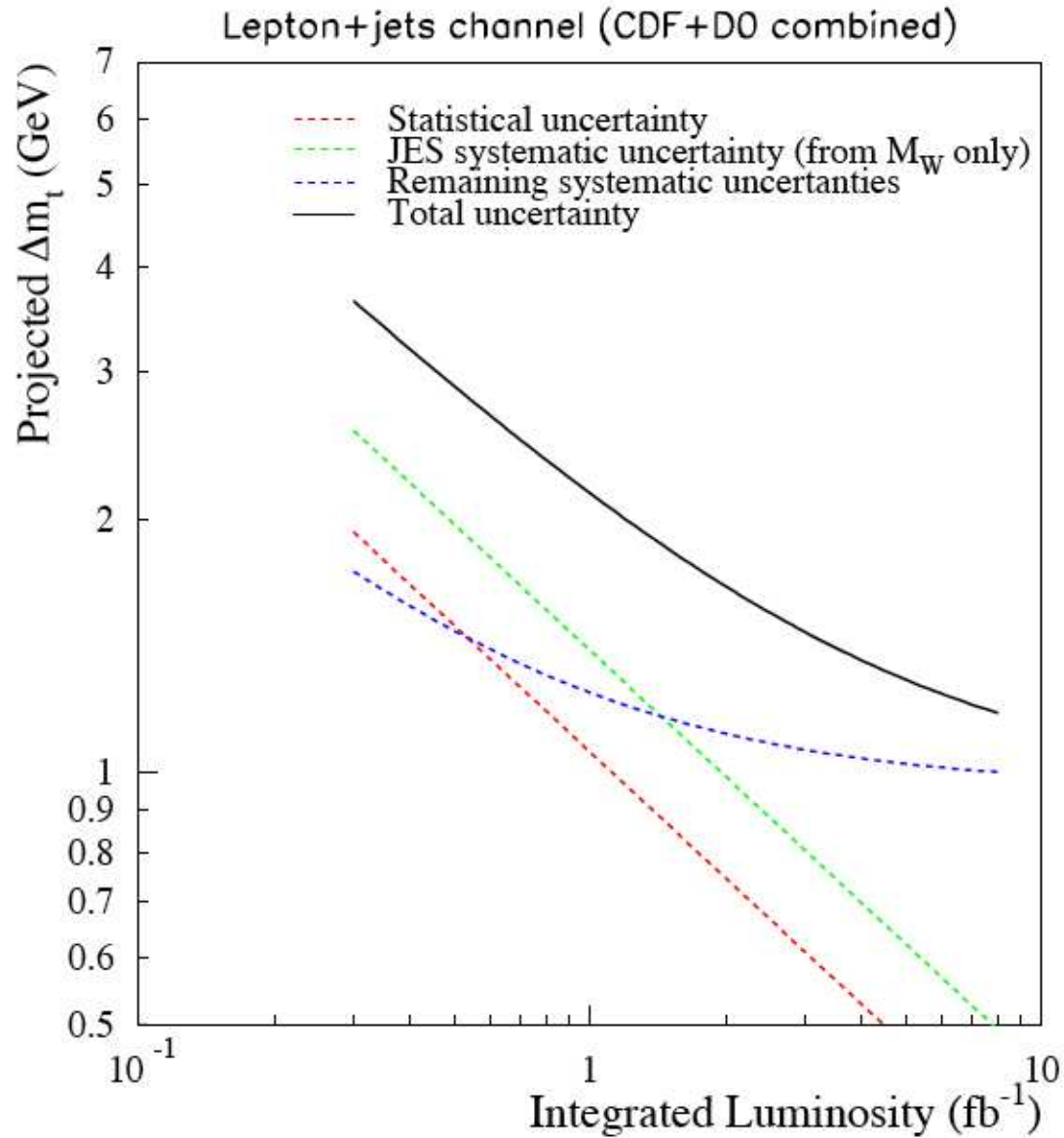
## A few physics examples: single top

Observation of  $t$  and  $s$ -channel productions separately: need D0 and CDF combined for  $5\sigma$   $s$ -channel



## A few physics examples: top mass

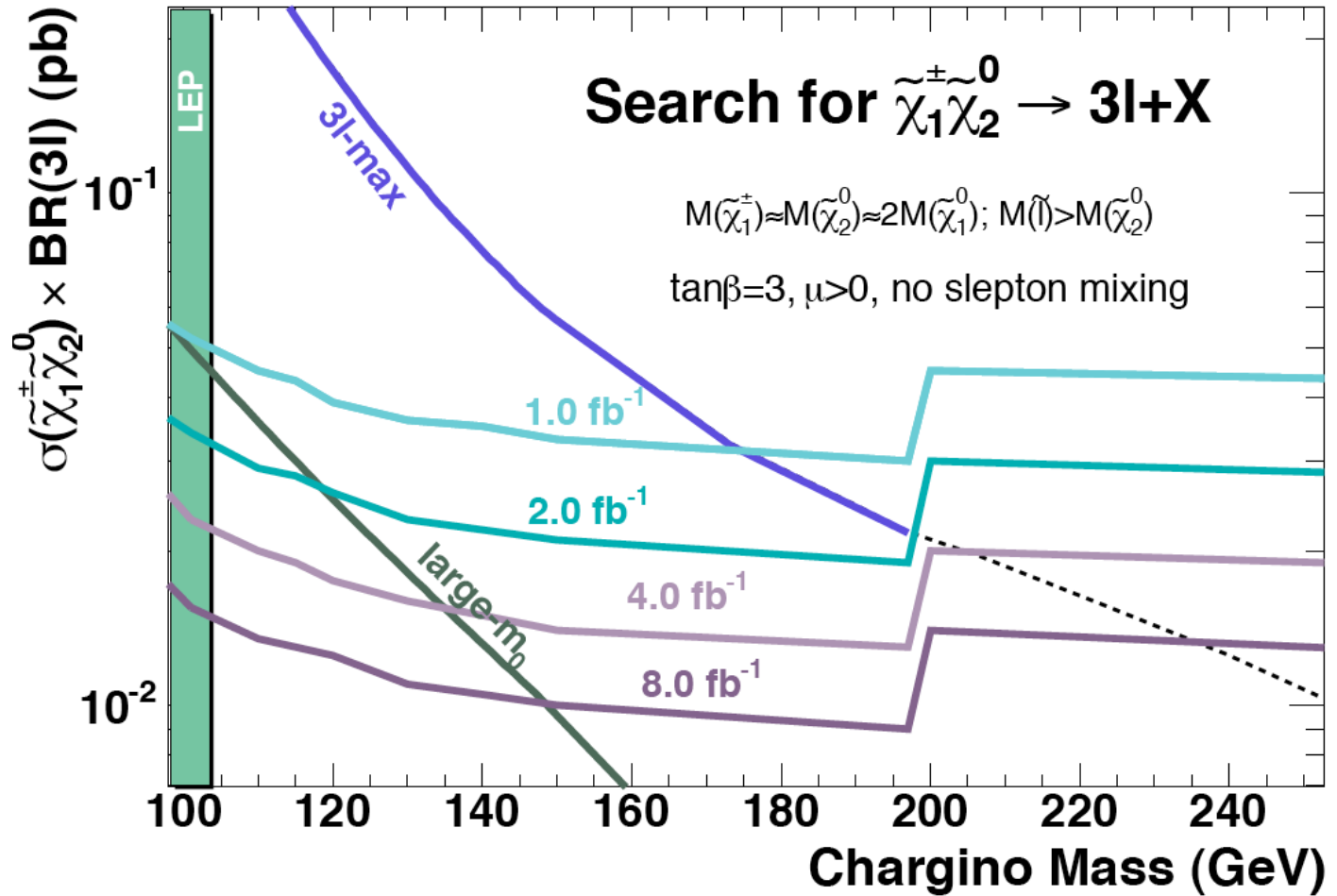
Reach on the top mass measurement: better than 1 GeV? Important since difficult at LHC





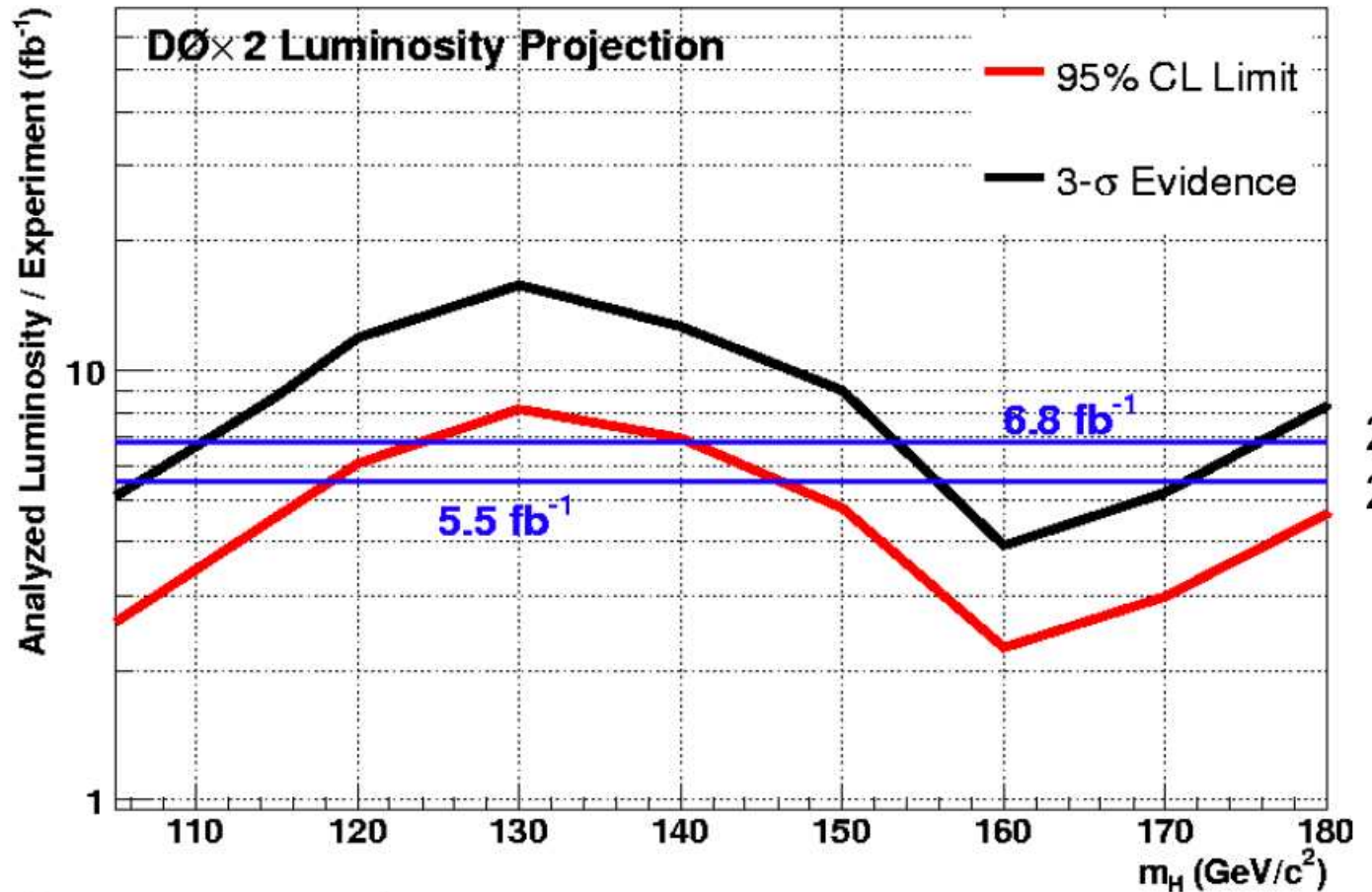
## A few physics examples: new phenomena

3 lepton searches: sensitivity on neutralino production



## A few physics examples: Higgs

Allow to cover fully the 95% exclusion everywhere, larger domain for 3  $\sigma$  evidence

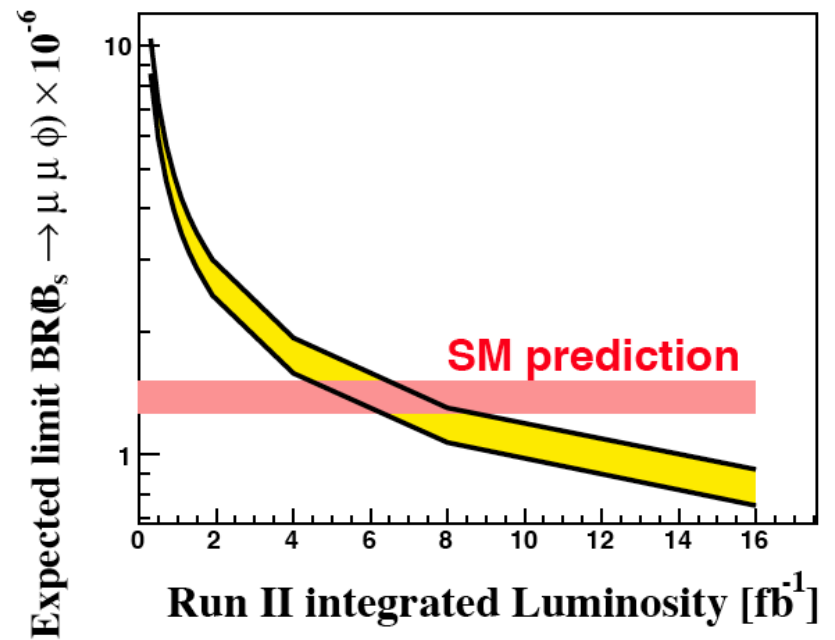
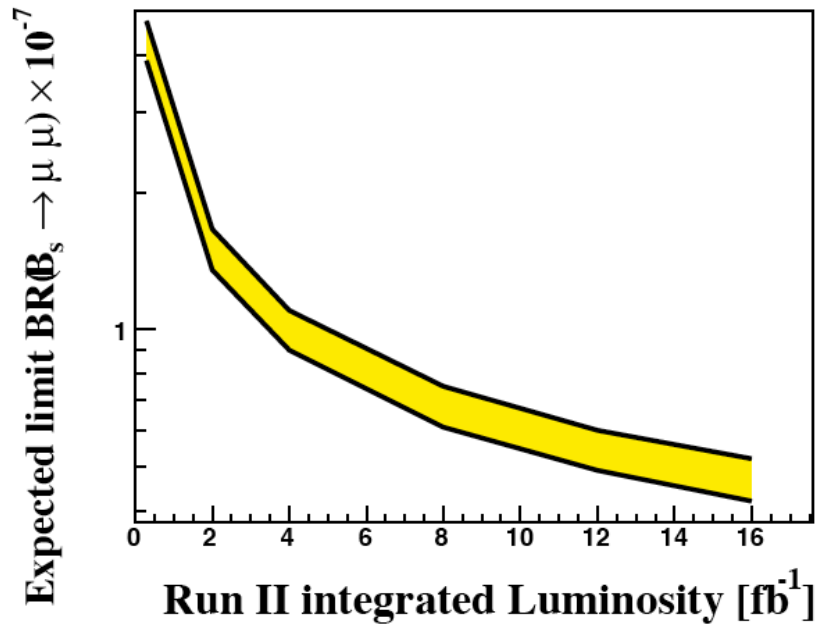


Assumes two experiments

2010  
2009

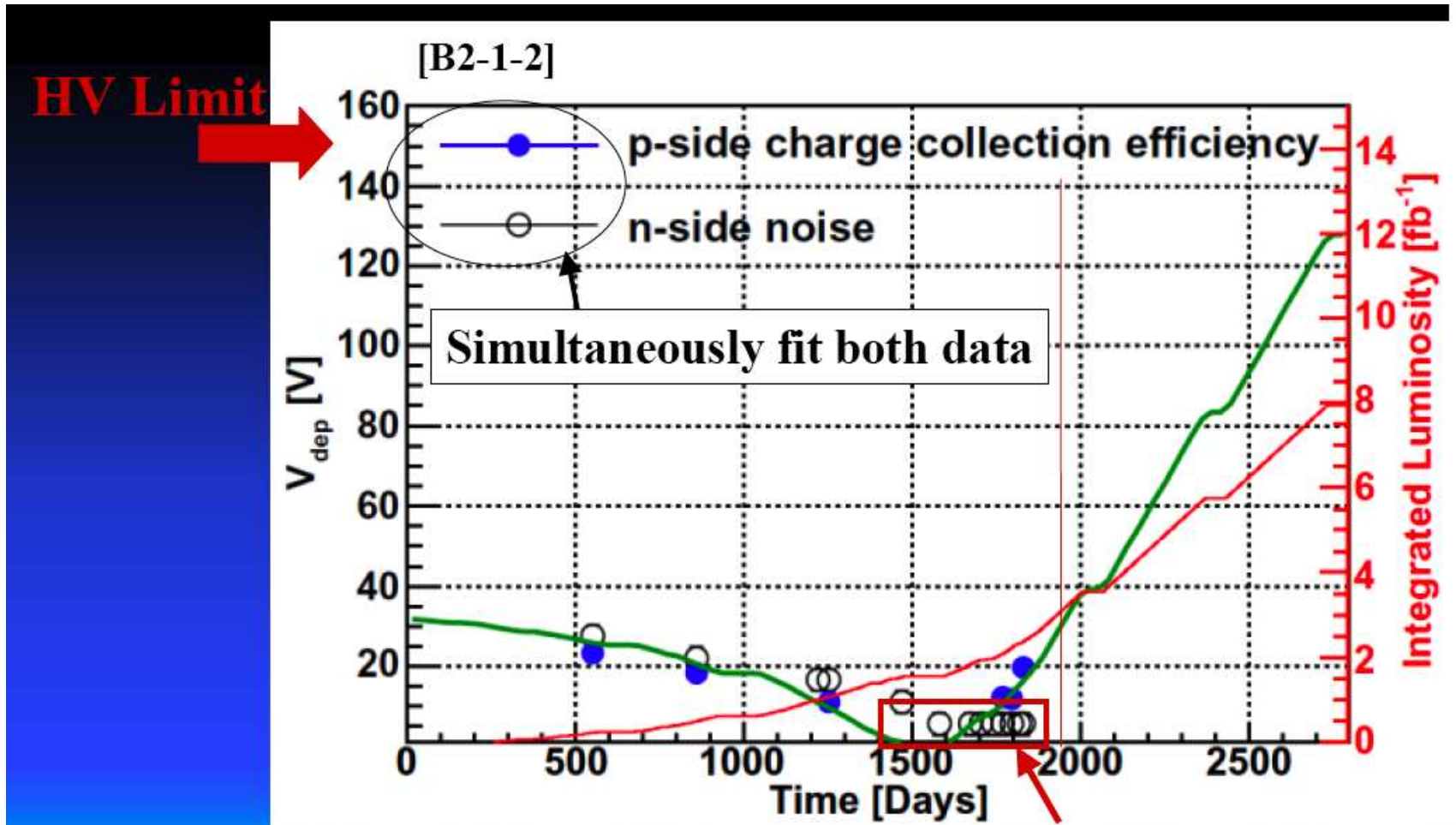
## A few physics examples: B physics

$B_S \rightarrow \mu\mu$  and  $B_S \rightarrow \mu\mu\Phi$ : better sensitivity, test of SM prediction



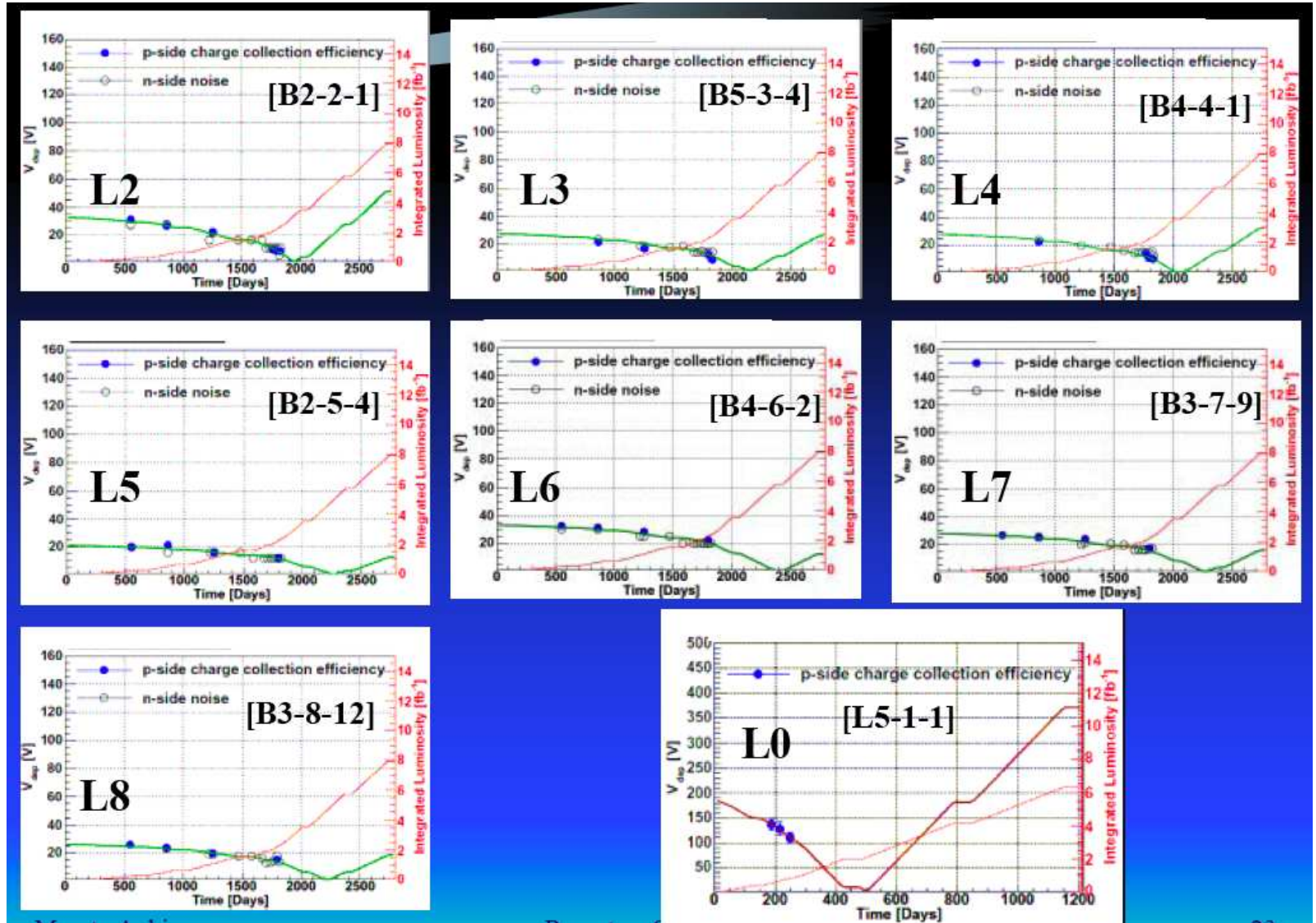
## D0 issues: detector

SMT layer 1: will die after 8-9  $\text{fb}^{-1}$ , will reach limit value of HV (Masato)



## D0 issues: detector

Other SMT layers: OK (layer 0 will “compensate” layer 1”)



## Different issues to run in 2011

- **Discussions:** within D0, also with Fermilab, CDF, P5 committee (physics studies to be redone with more lumi)
- **D0 detector:** SMT layer 1 will die, layer 0 can “replace” it as foreseen; we might need to replace the lumi detectors again before 2011; no aging yet seen for CFT
- **Trigger:** The Tevatron scheme is not to go beyond 400 E30, the present trigger version can cope with it but needs further improvement to be more efficient at the highest lumi
- **Computing:** CAB should be ok for online reconstruction... if we do not go much beyond 100 Hz at L3; MC production performed in different farms (Lyon is the place producing most of the MC)
- **Finances:** Fermilab requests an additional 30 million US dollars for running in 2011 to DOE; NSF/France supports probably 2011 running (post-docs, students, travel money...)
- **Manpower:** crucial for detector operation. software, analyses that D0 cannot miss

## D0 France in 2011: discussion

- Physics contributions:
  - New Phenomena - Arnaud
  - Higgs - Gregorio
  - Electroweak - Jan
  - Top - top mass, single top, statistically limited measurements (spin correlations, asymmetries, different for  $pp$  and  $p\bar{p}$ )
  - QCD - not much, finalise inclusive  $p_T$  cross section at high  $p_T$ , dijet angular distribution sensitive to high mass resonances
- Manpower in D0 France in 2011: Students/post-docs? Common PhDs between LHC and D0? D0 more attractive (good experience for ATLAS/CMS)? How to help on online activities (daq shifts/experts)? (if needed, Fermilab travel money can help)
- Financial support for 2011: IN2P3/CEA? travel money? Students post-docs?
- Id and software activities: b-tagging,  $V$ +jets (MC description of our data, better signal efficiencies, MC improvement such as  $W + 2$  jets,  $W + 3$  jets,  $Wb\bar{b}$  and  $Zb\bar{b}$ ), b JES, fake tracks and jets, good documentation and software stability...
- Physics topics: Which ones? Dependence on manpower?