# Search for Electro-Weak Top Quark Production at D0 [CMS]

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Matthias Kirsch, Daniel Lenz,
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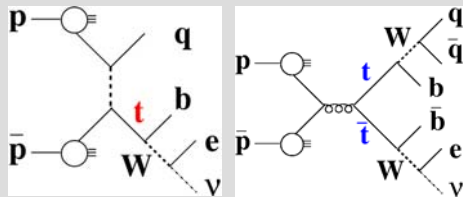RWTH-Aachen
3.4.2006

# Analysis Steps

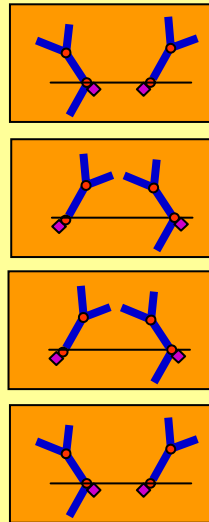| Detector Recon- struction | Production Hypotheses: eg.MadGraph | Parton Recon- struction | Judgement: probability of process? |
|---|---|---|---|
| $\mu$ | $\mu$ | | *sensitive & reliable observables?* |
| Jet | $\nu$ | | |
| Jet | $q$ | | |
| $\not{E}_T$ | $q$ | | |
| Experim. | Theory | Experim. | Theory&Exp. |
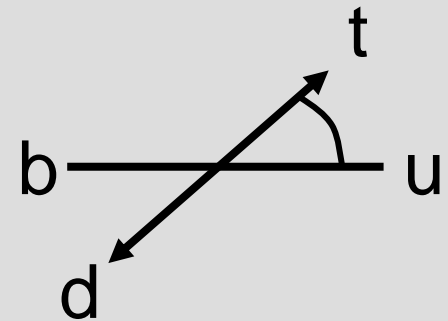
# **Visual Physics Analysis eXpert**

*a tool for interactive physics interpretation of HEP events*

Factory

Process

Event

Container

Relations

Collision

Vertex

Particle

VisualPax - File Browser, Event Editor & Process Modelling

File
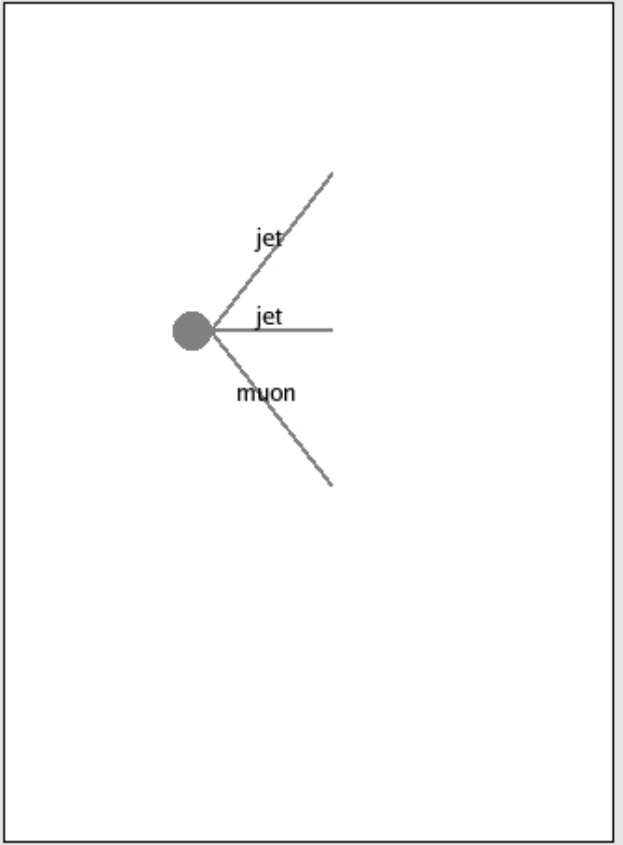
| Open File | Close File | Save Event As | Append Event To | Clear Event | Arrange Interpret | Delete Interpret |

Event:

Interpret:

NEW (...)
Higgs(Z)
Reconstructed Particles
Reconstructed Process

Physics-Objects:

Vertex - FourVector   Collision - Vertex

Add: Vertex

jet
jet
higgs
Z1
Z
muon
muon

Properties:

| Main: FourVector | |
| --- | --- |
| PaxId | 27 |
| PaxName | Z |
| Charge | 0 |
| Locked | False |
| ParticleId | 0 |
| Simulated | 0 |
| Status | 0 |
| Workflag | 0 |
| Vector | |
| Mass | 77.145572 |
| Energy | 98.558538 |
| Pt | 56.978705 |
| Px | -7.922004 |
| Py | 56.425302 |
| Pz | 22.710641 |
| phi | 1.710283 |
| theta | 1.191514 |
| eta | 0.388718 |
| UserRecords | |
| NEW {...} | |
| AutoProcess Definitions | |
| NEW ... | |
| Visualization | |

Event no. 6

# Editor for process prescription

# Browser for reconstructed data

# Visual PAX: reconstructed data
## Auto Process

# Visual PAX: reconstructed data
# Auto Process

# Visual PAX: Root Tree



all event configurations

select per event:
best rec.top mass
using Root macro
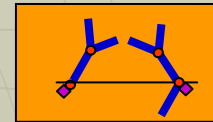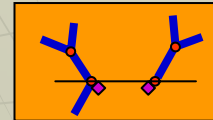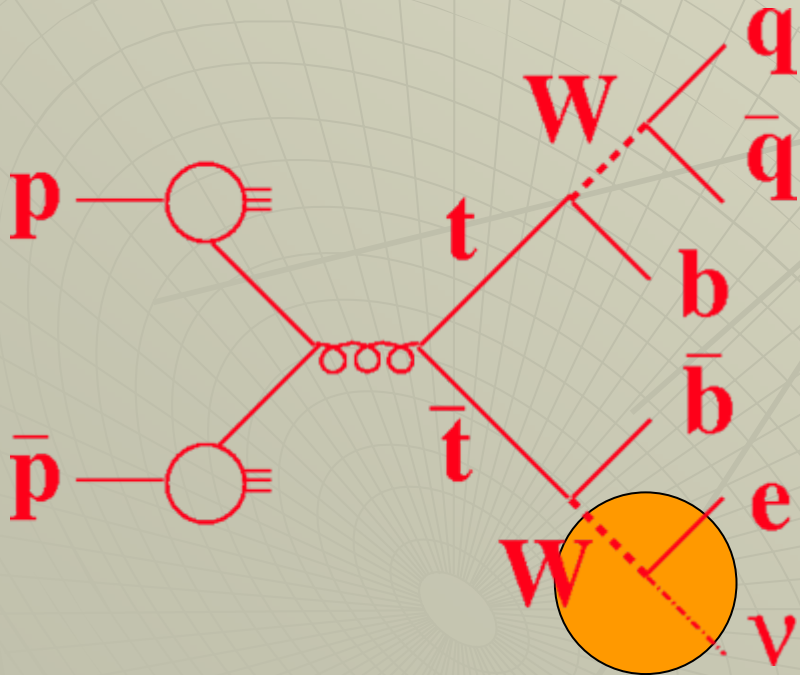
# PAX: Auto Process

*for a given physics process*

*automatically reconstruct all possible event configurations*
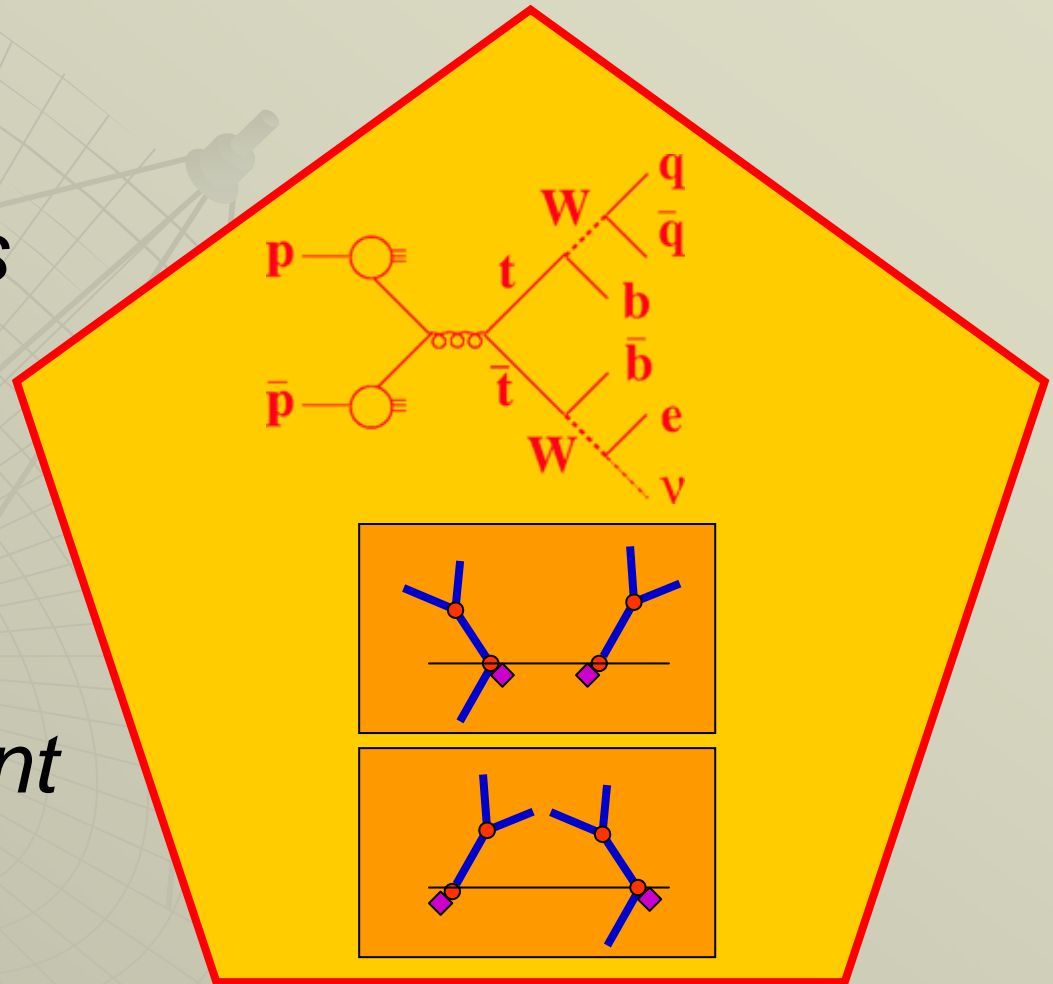
# PAX: Auto Process
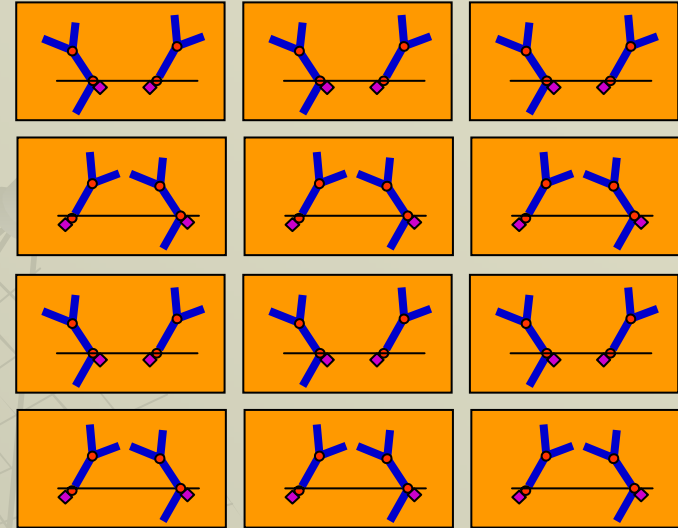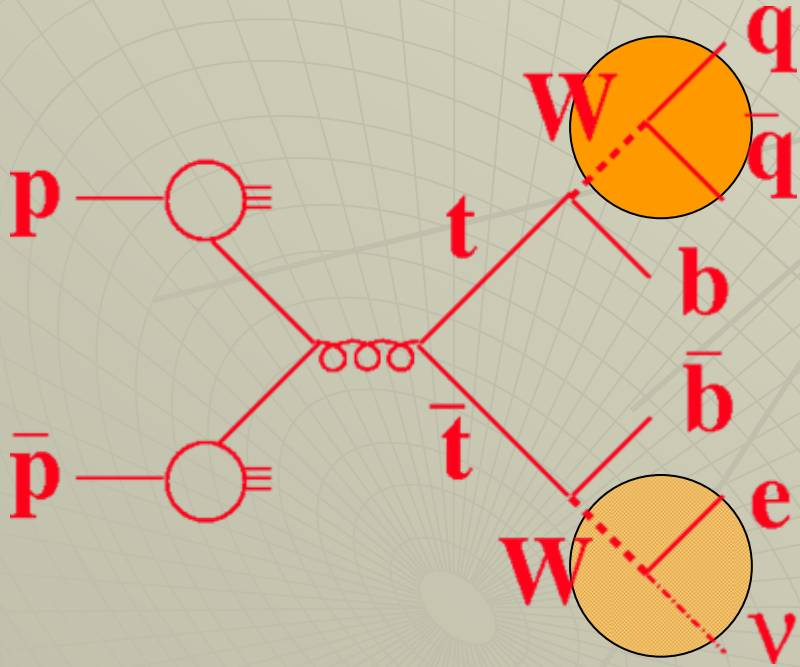
# PAX: Auto Process

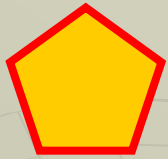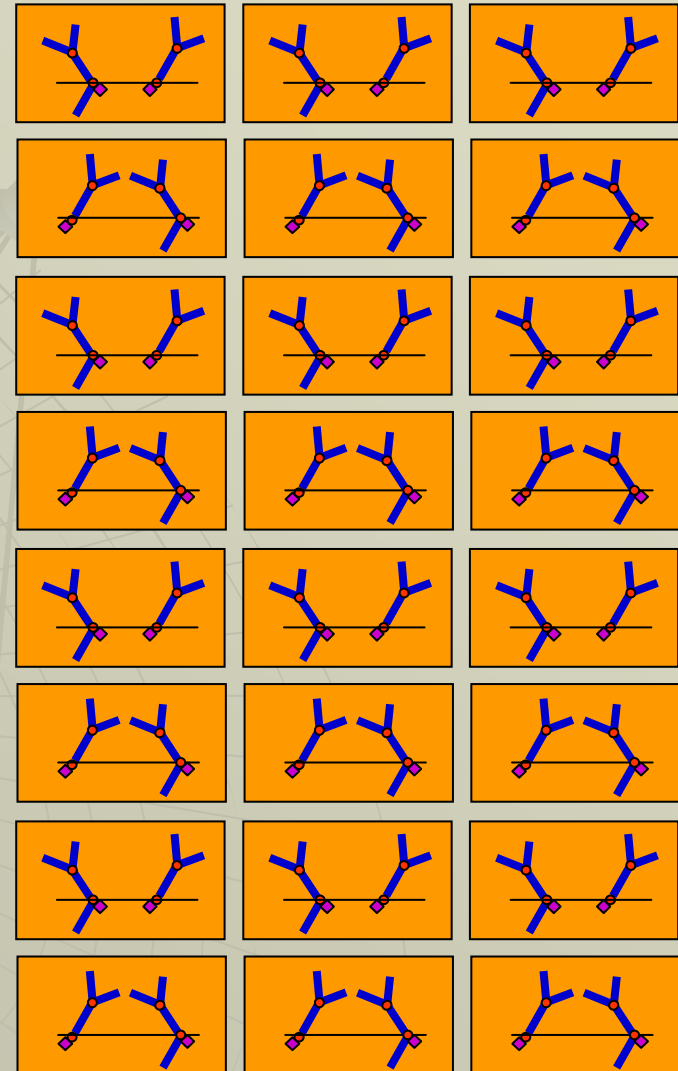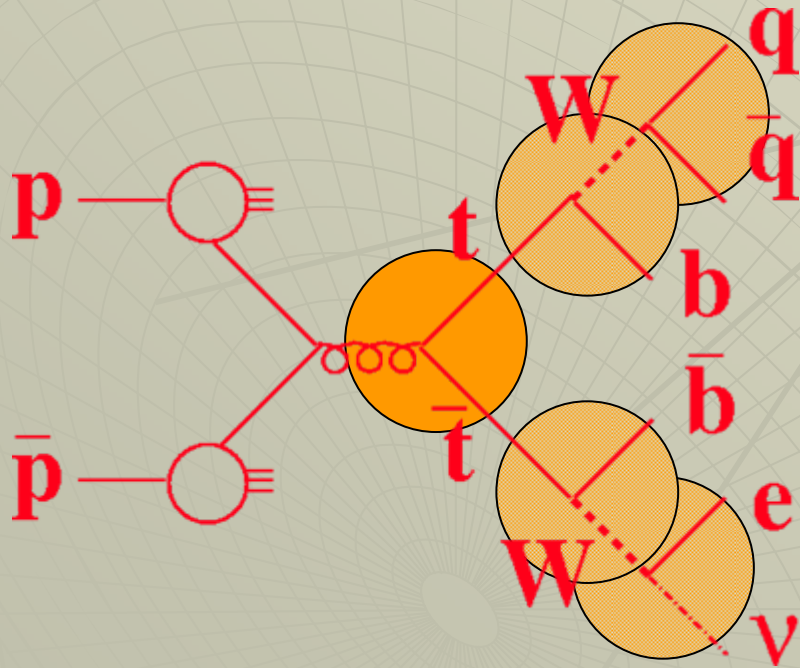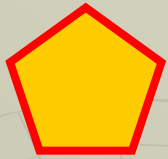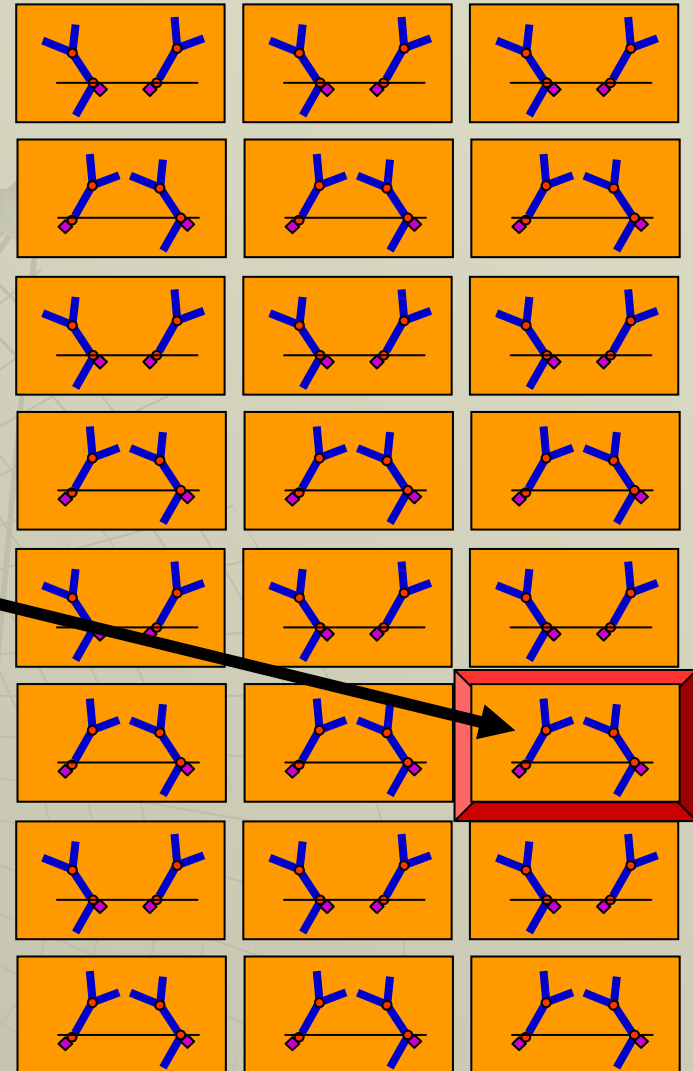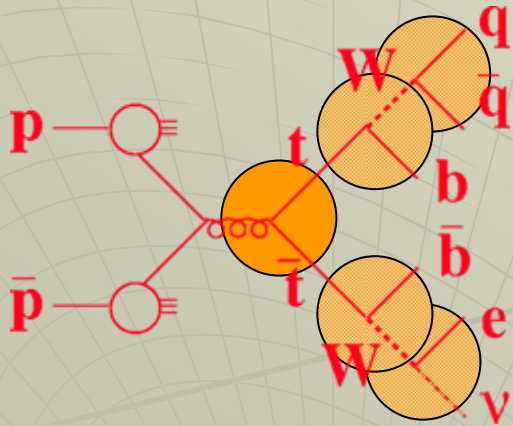# PAX: Auto Process

# PAX: Auto Process

*Judgement: probability of resulting from a ttbar event? We need reliable, sensitive observables  w.r.t. HO corrections, Parton distributions, …*

# My primary question to workshop

*Judgement, i.e., event probability of*
* *resulting from a top physics process*
* *configuration correctly reconstructed*

*What are sensitive, reliable observables w.r.t.*
* *HO corrections*
* *Parton distributions*
* *… ???*