Presentation

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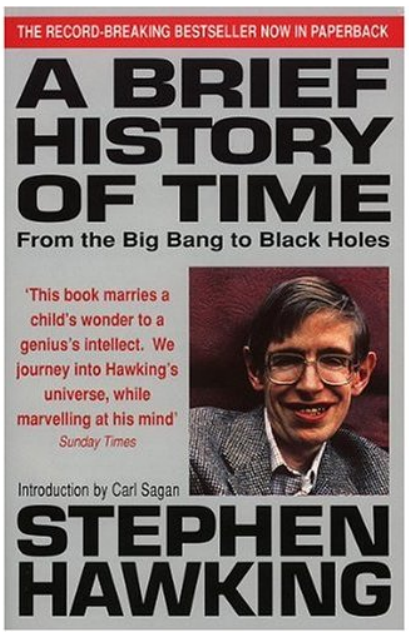
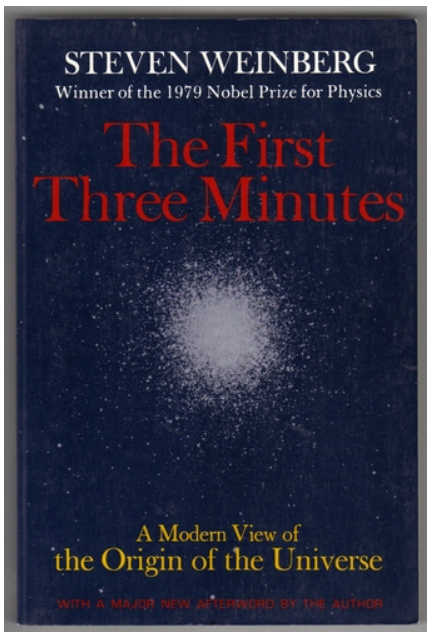
Curriculum

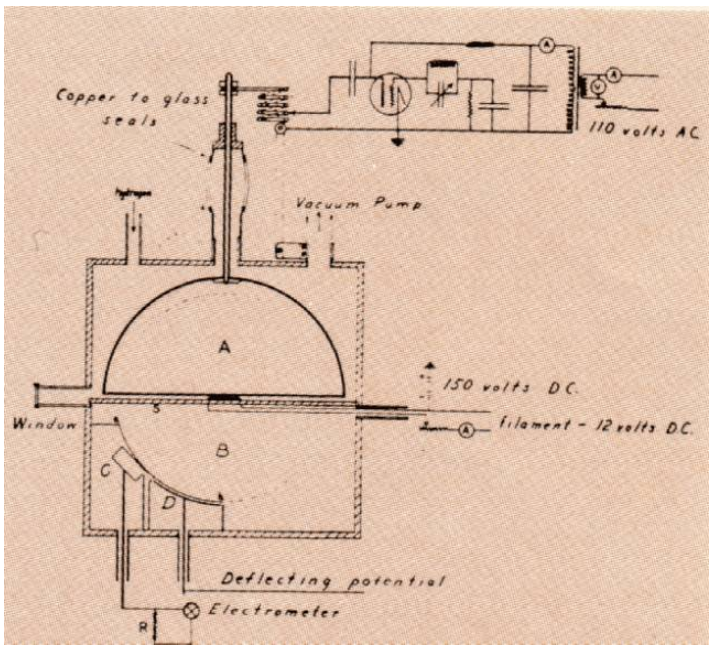
1. 2001-2004, Physics Licence (Université de la Méditerrannée)
2. 2004-2006, Physics Master (Université de la Méditerrannée)
3. 2006-2009, PhD. Flavour tagging in LHCb (Université de la Méditerrannée)
4. 2010-now, CERN fellowship

Initial interest in High Energy Physics

First interest in HEP: at 15 years old, high school:







Wanted to work on accelerator physics, and make new discoveries. . .

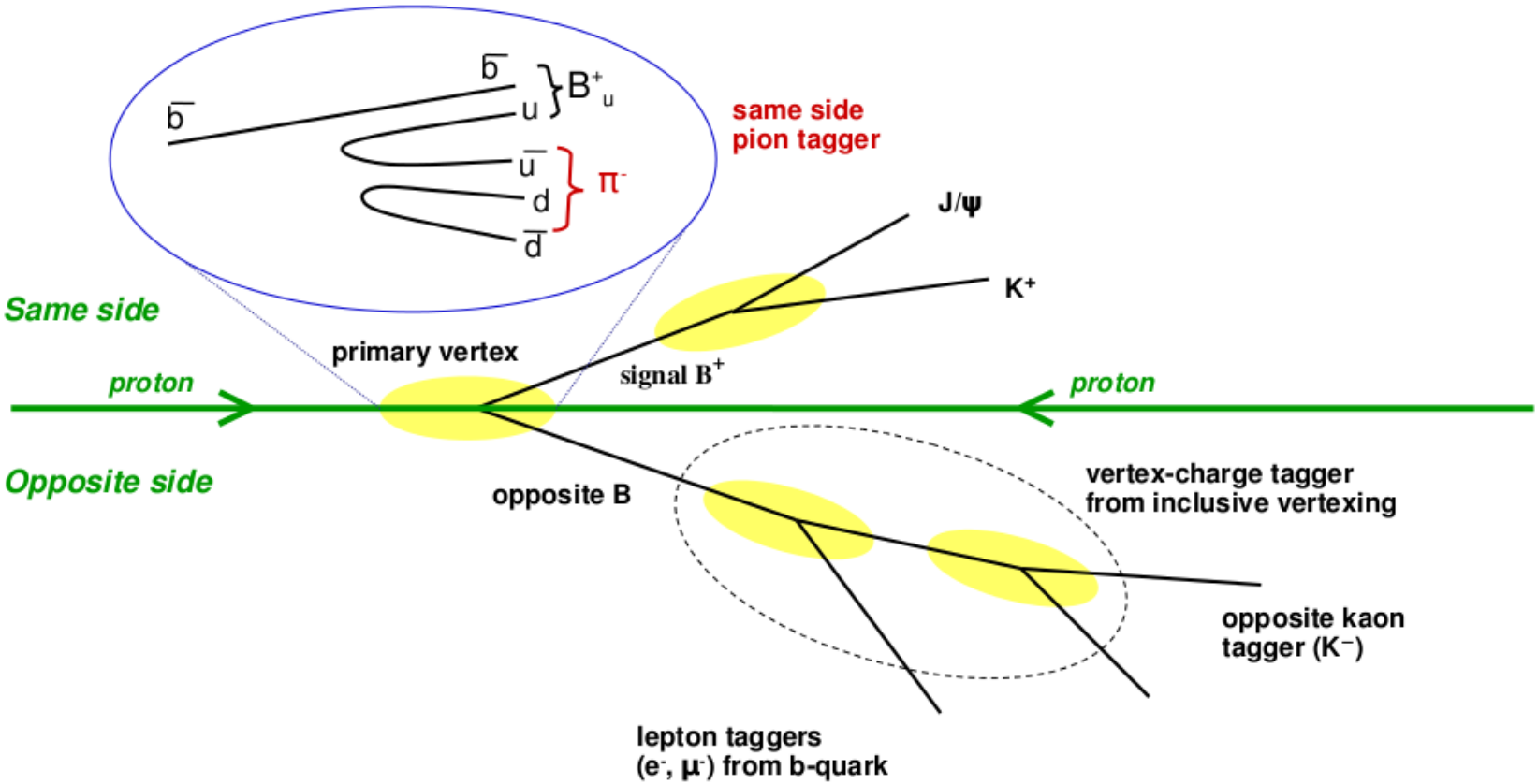
Decided to study high energy physics!

Part I

2006-2009, PhD.: Flavour tagging in LHCb

Flavour tagging in LHCb

Definition: determine the flavour (charge) of a b quark at its production.



Essential for many CP violation measurements: $\sin(2\beta)$, β_s, etc.

From interships to the PhD.

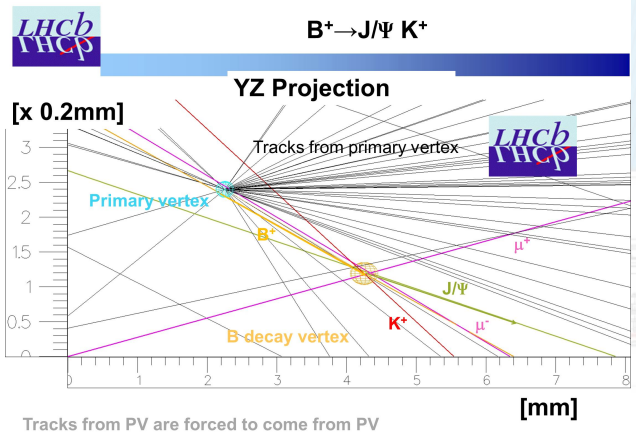
- Started studying flavour tagging between Licence and Master, with O. Leroy in the LHCb group at CPPM.
- Internship at CERN in summer 2005: Flavour tagging in Panoramix
- Master's internship with O. Leroy: Study of secondary vertex reconstruction for flavour fagging in LHCb
- Accepted as PhD. student under direction of R. Le Gac in the LHCb group of CPPM

PhD.: Physics content

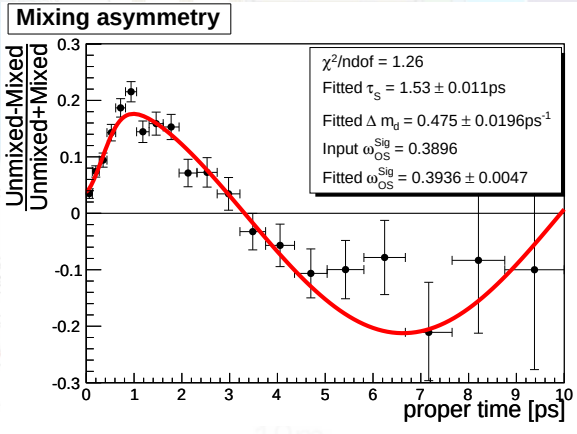
Title: Calibration of the flavour tagging algorithm of the LHCb experiment by the measurement of $\sin(2\beta)$

- Selection of control channels: $B^+ \to J/\psi K^+$ and $B_d^0 \to J/\psi K^{*0}$
- Measurement of the mistag fraction using B_d^0 mixing property
- Measurement of $\sin(2\beta)$ in $B_d^0 \to J/\psi K_S^0$ using previously measured mistag rate, systematics' studies

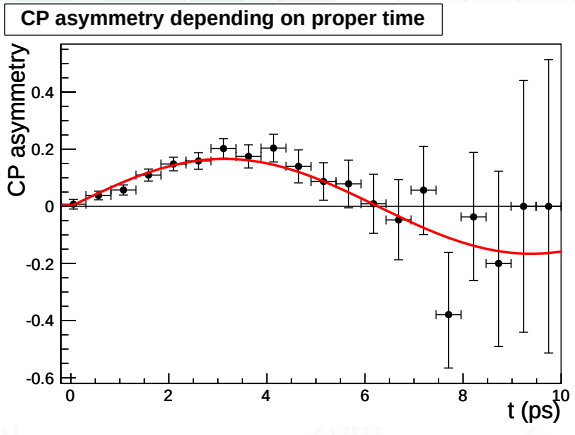
$B^+ \to J/\psi K^+$



Mistag fraction

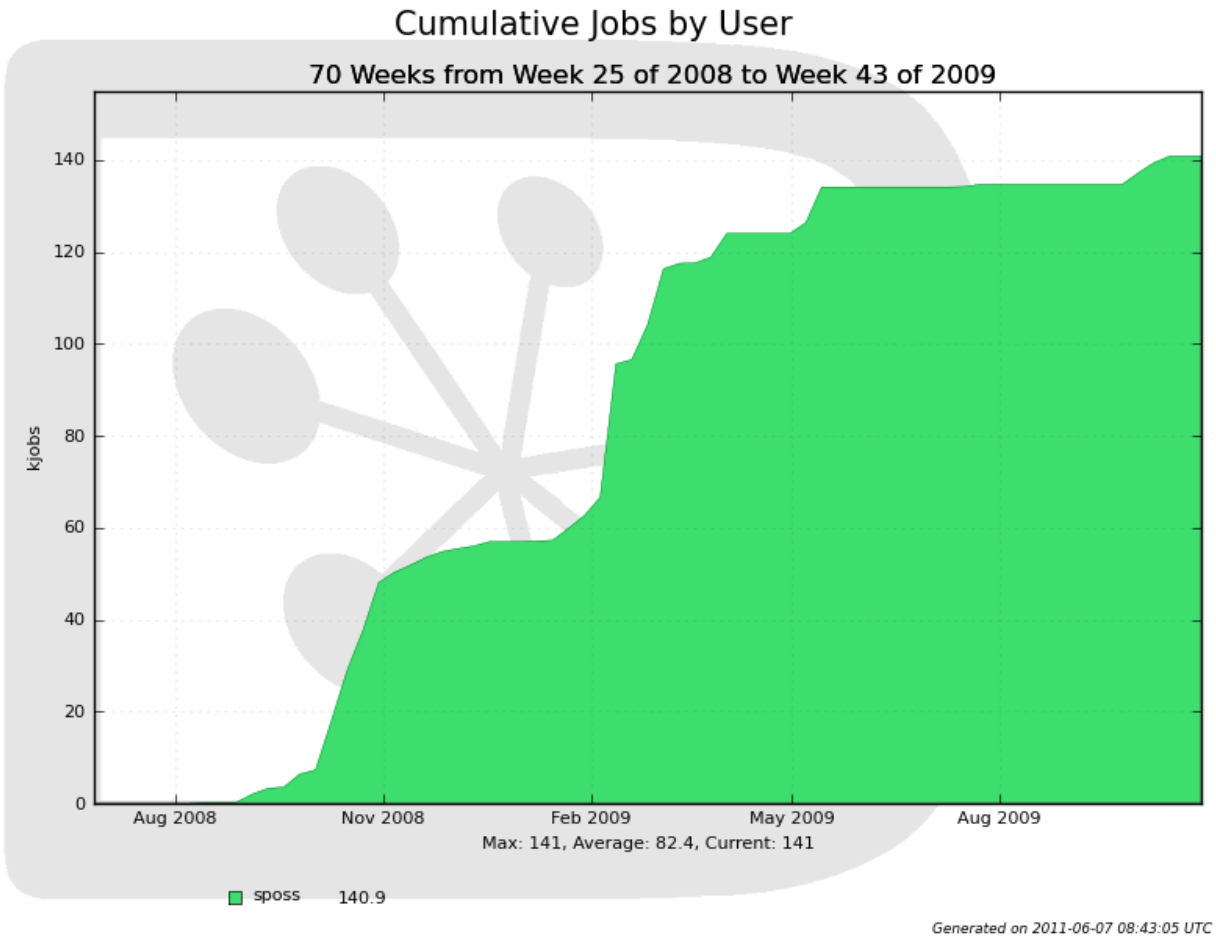


$\sin(2\beta)$



PhD.: Using DIRAC in LHCb

Several millions of events to analyse + thousands of toy MC studies: used DIRAC a lot.



I wanted to be involved in the development of this tool.

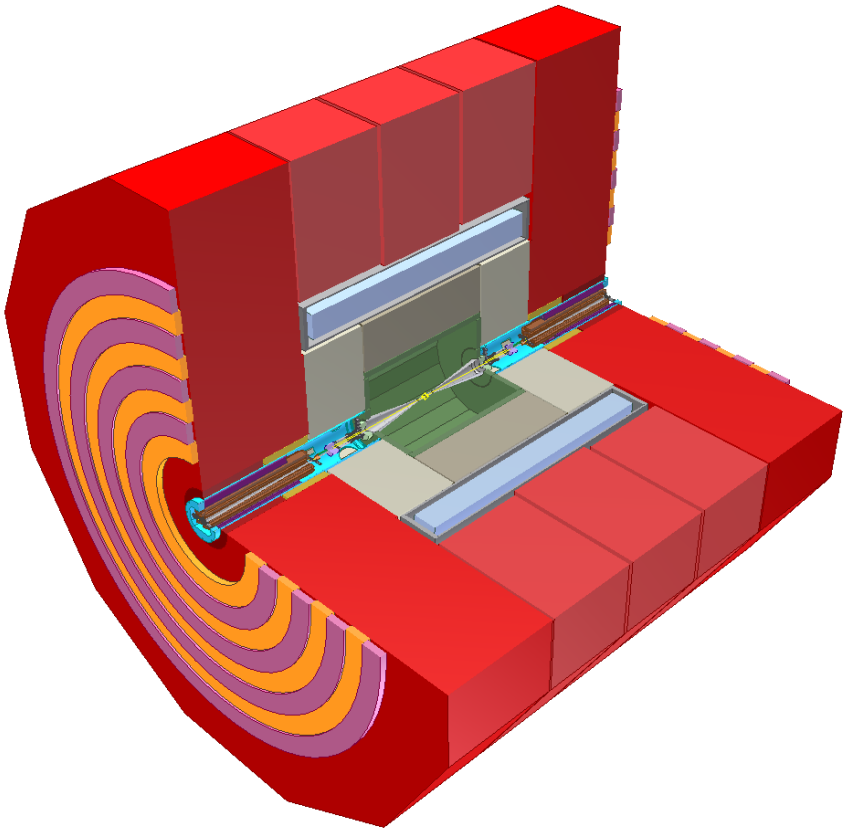
Part II

Fellowship, 2010-now

The project

- Applied for fellowship at CERN, emphasis on DIRAC in LHCb
- Contacted by L. Linssen (LCD group) to develop a DIRAC instance for the ILC VO:
  - Aim is mass production of Monte Carlo data for the CLIC Conceptual Design Report (CDR): benchmark of 2 detector concepts, ILD and SiD
  - Document must be finished in 2011: need fast solution
  - DIRAC was proven by LHCb to be efficient
  - DIRAC team wanted to show it could be used outside LHCb

CLIC detectors



CLIC and ILC are future Linear Colliders

Detectors' design similar to CMS

Main difference between models: the tracking system

- ILD uses a TPC
- SiD uses silicon layers

The ILCDIRAC instance

ILCDIRAC: DIRAC instance dedicated to the linear collider community:

- CLIC and ILC share the same virtual organisation
- Specific interface to handle ILC applications: 6 different types with different user interfaces
- Written in PYTHON to follow DIRAC framework
- documentation to be usable by many others

Essentially my developments, but with help from DIRAC developers and LHCb team.

More than 2 million jobs processed in 1 year: CLIC CDR production and user jobs.

Users not only at CERN, but also LAL (Fr.), MPI (De.), VINCA (R.S.), etc.

Current activities

ILCDIRAC management:

- Development of new features
- Realisation of documentation: tutorial slides, online code documentation
- Monitoring of system status: VOBOX and grid resources
- Installation and setup of services

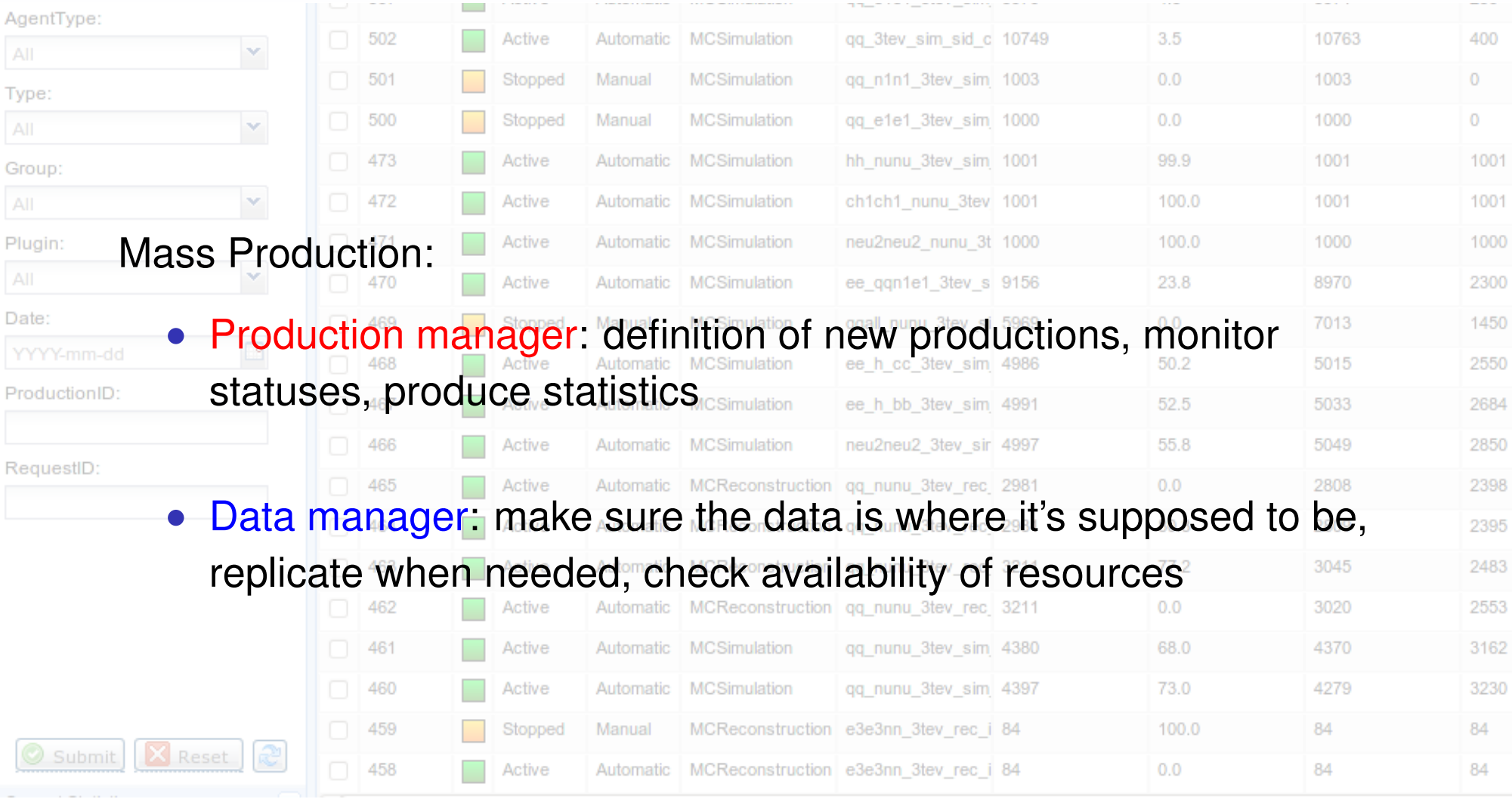
Current activities (Cont'd)

Physics generation:

- Setup framework for convenient physics generation: 2 generators, WHIZARD and PYTHIA
- Implement channels in the 2 generators used, perform tests
- Interface to ILCDIRAC

CERN representative of the working group dedicated to common generator tools for the Linear Colliders.

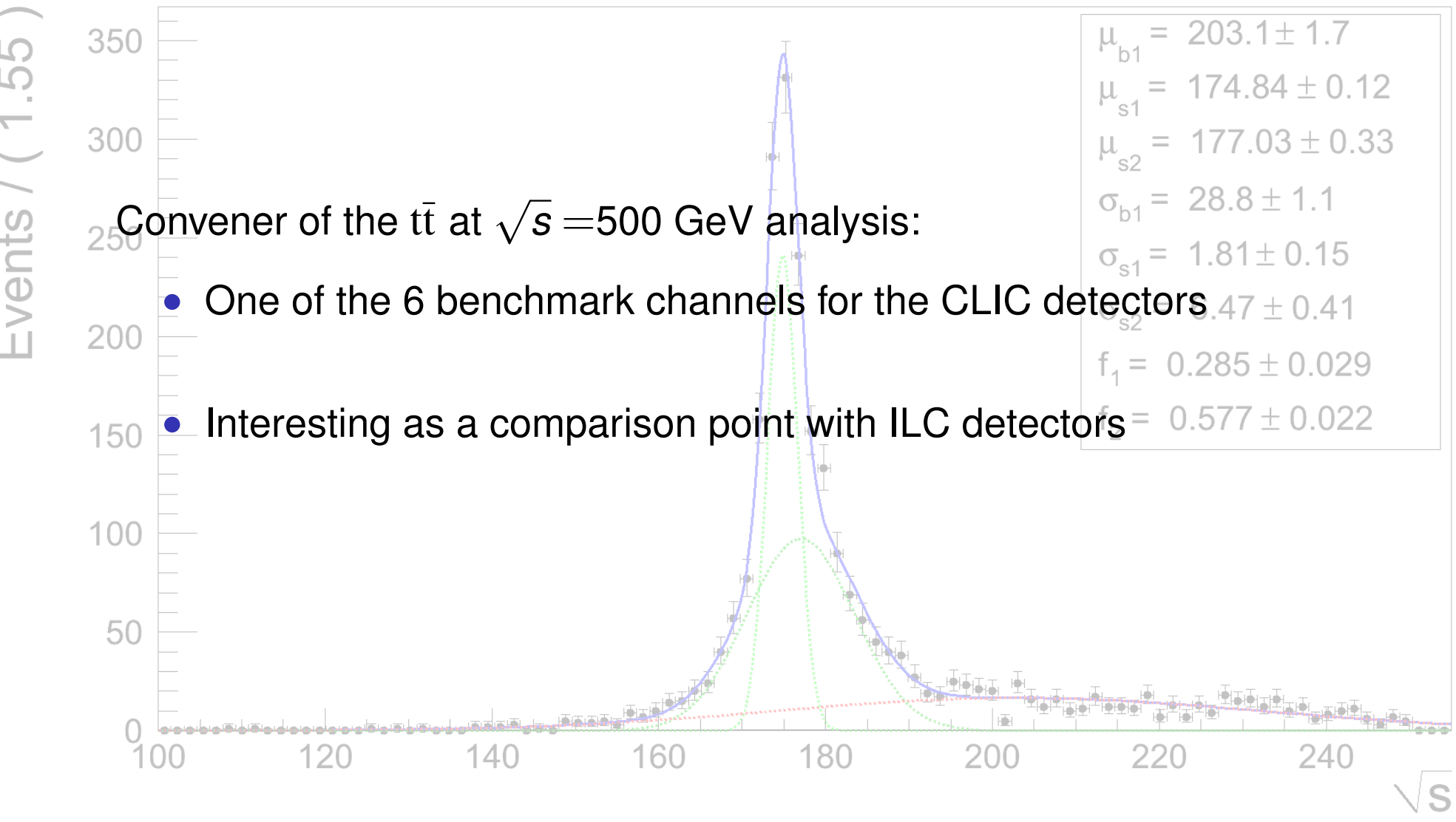
Current activities (Cont'd)



Mass Production:

- Production manager: definition of new productions, monitor statuses, produce statistics
- Data manager: make sure the data is where it's supposed to be, replicate when needed, check availability of resources

Current activities (Cont'd)



Convener of the $t\bar{t}$ at $\sqrt{s}$ =500 GeV analysis:

- One of the 6 benchmark channels for the CLIC detectors
- Interesting as a comparison point with ILC detectors

Student supervision

P. Majewski (Master student):

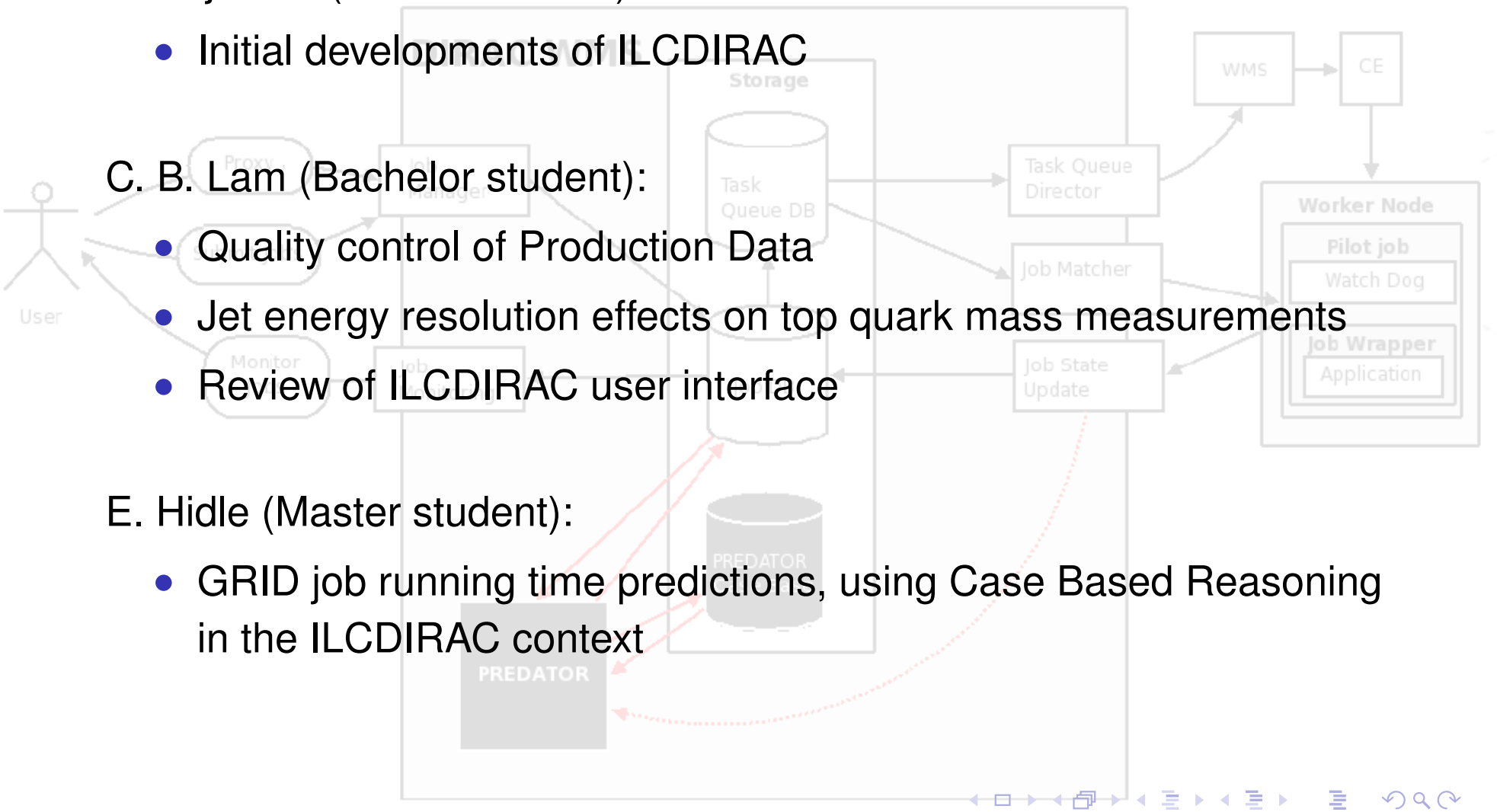
- Initial developments of ILCDIRAC

C. B. Lam (Bachelor student):

- Quality control of Production Data
- Jet energy resolution effects on top quark mass measurements
- Review of ILCDIRAC user interface

E. Hidle (Master student):

- GRID job running time predictions, using Case Based Reasoning in the ILCDIRAC context



Part III

Summary in relation to offered position

Summary

- Design and implementation of DIRAC instance for Linear Collider community: ILCDIRAC
- Support of system, operational aspects
- Collaborative work with DIRAC developers
- User support
- Student supervision, group collaboration