

Presentation

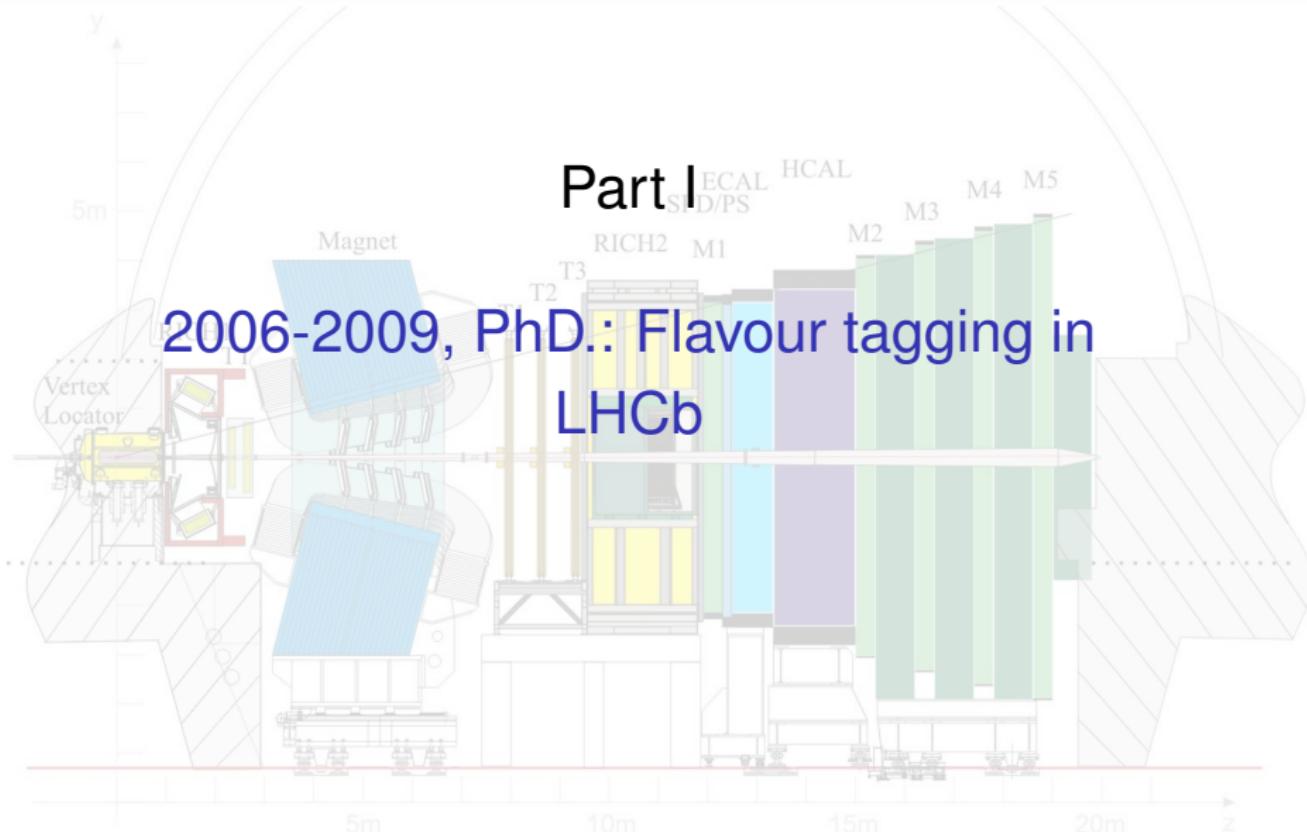
Stéphane Poss

Job reference: INPS12-8

October 1, 2012

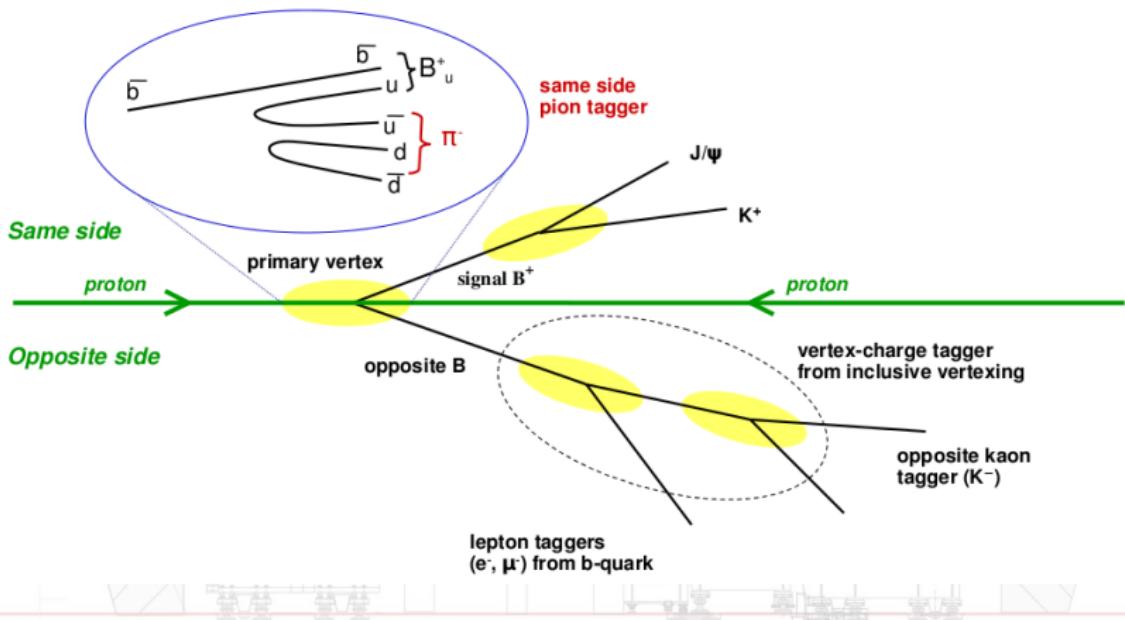
Curriculum

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



Flavour tagging in LHCb

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



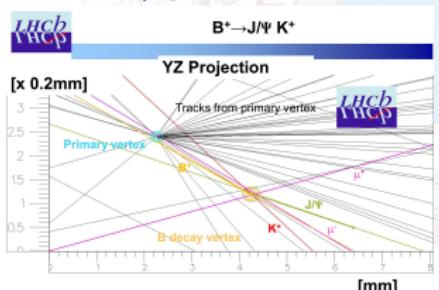
Essential for many CP violation measurements: $\sin(2\phi_1)$, β_s , etc.

PhD.: Physics content

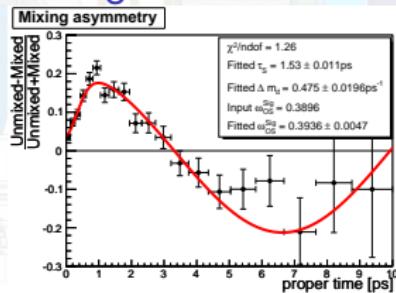
Title: Calibration of the flavour tagging algorithm of the LHCb experiment by the measurement of $\sin(2\phi_1)$

- Selection of control channels: $B^+ \rightarrow J/\psi K^+$ and $B_d^0 \rightarrow J/\psi K_S^{*0}$
- Measurement of the mistag fraction using B_d^0 mixing property
- Measurement of $\sin(2\phi_1)$ in $B_d^0 \rightarrow J/\psi K_S^{*0}$ using previously measured mistag rate, systematics' studies

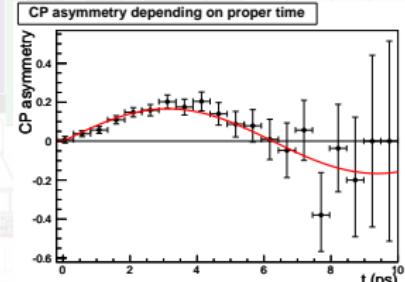
$B^+ \rightarrow J/\psi K^+$

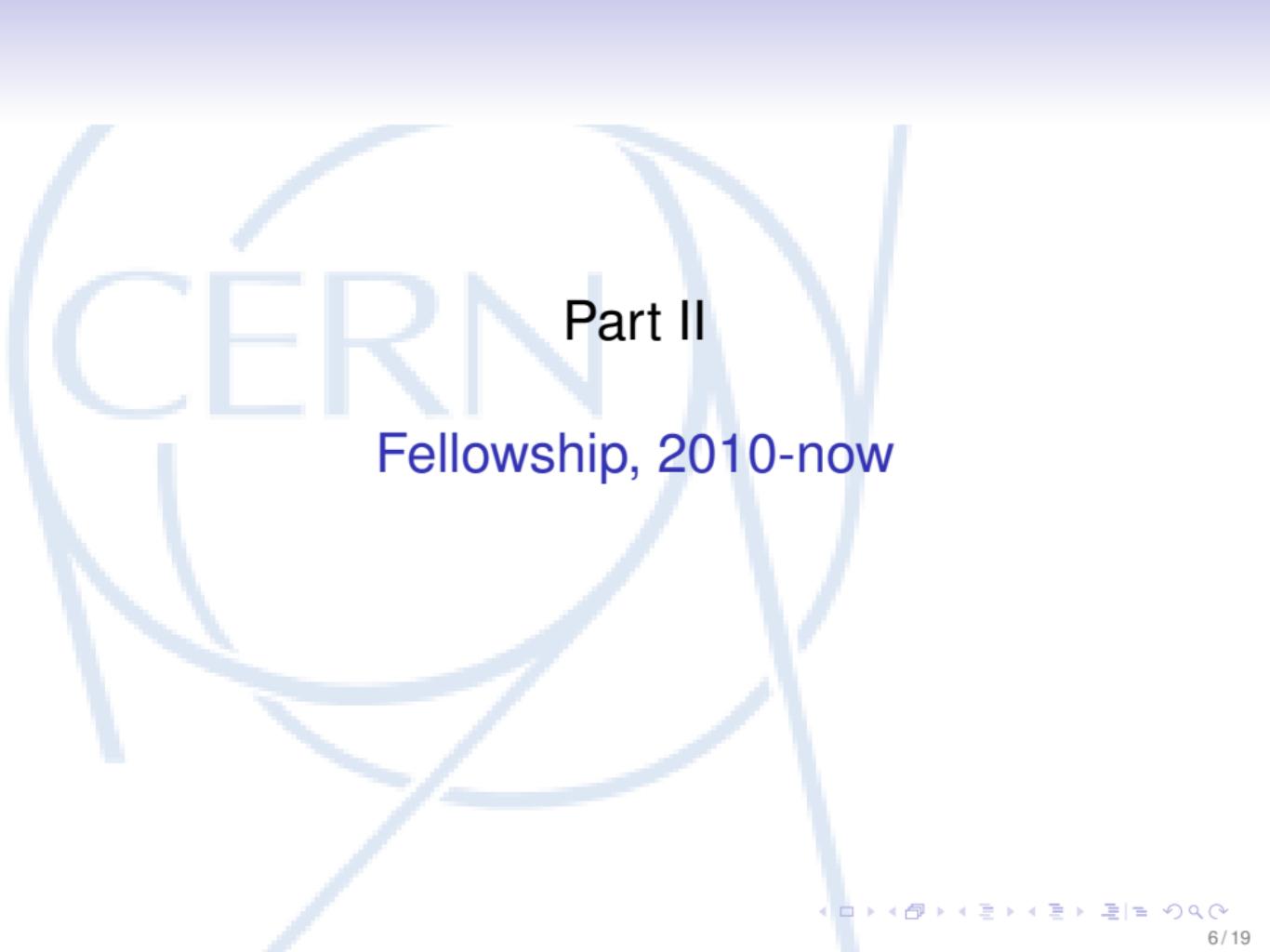


Mistag fraction



$\sin(2\phi_1)$



A large, faint watermark of the CERN logo is visible in the background, consisting of the word "CERN" in a serif font inside a circular particle collision track.

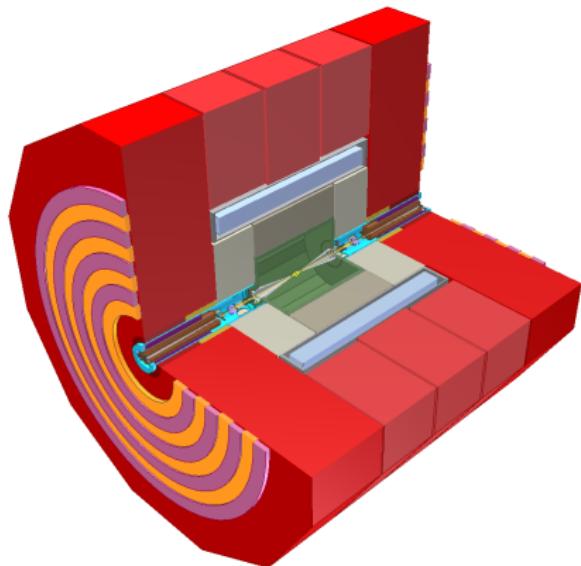
Part II

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 client for the ILC VO**:
 - Aim was **mass production of Monte Carlo data** for the CLIC Conceptual Design Report (CDR): **benchmark of 2 detector concepts**, ILD and SiD
 - Document **finished in 2011**: needed 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
- Now **adopted by the ILC SID community** for their Detailed Baseline Detector document mass production

More than **6 million jobs processed in 2.5 year**: CLIC CDR production, SID DBD production and user jobs.

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

AgentType:	All
Type:	All
Group:	All
Plugin:	All
Date:	YYYY-mm-dd
ProductionID:	
RequestID:	
<input type="button" value="Submit"/>	<input type="button" value="Reset"/>

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

	502	Active	Automatic	MCSimulation	qq_3tev_sim_sid_c 10749	3.5	10763 400
	501	Stopped	Manual	MCSimulation	qq_n1n1_3tev_sim 1003	0.0	1003 0
	500	Stopped	Manual	MCSimulation	qq_e1e1_3tev_sim 1000	0.0	1000 0
	473	Active	Automatic	MCSimulation	hh_nunu_3tev_sim 1001	99.9	1001 1001
	472	Active	Automatic	MCSimulation	ch1ch1_nunu_3tev 1001	100.0	1001 1001
	471	Active	Automatic	MCSimulation	neu2neu2_nunu_3t 1000	100.0	1000 1000
	470	Active	Automatic	MCSimulation	ee_qqn1e1_3tev_s 9156	23.8	8970 2300
	469	Stopped	Manual	MCSimulation	ee_h_cc_3tev_sim 4986	0.0	7013 1450
	468	Active	Automatic	MCSimulation	ee_h_bb_3tev_sim 4991	50.2	5015 2550
	467	Active	Automatic	MCSimulation	ee_h_bb_3tev_rec 2981	52.5	5033 2684
	466	Active	Automatic	MCSimulation	neu2neu2_3tev_sir 4997	55.8	5049 2850
	465	Active	Automatic	MCReconstruction	qq_nunu_3tev_rec_ 2981	0.0	2808 2398
	464	Active	Automatic	MCReconstruction	qq_nunu_3tev_rec_ 3203	0.0	3045 2483
	462	Active	Automatic	MCReconstruction	qq_nunu_3tev_rec_ 3211	0.0	3020 2553
	461	Active	Automatic	MCSimulation	qq_nunu_3tev_sim 4380	68.0	4370 3162
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	459	Stopped	Manual	MCReconstruction	e3e3nn_3tev_rec_i 84	100.0	84 84
	458	Active	Automatic	MCReconstruction	e3e3nn_3tev_rec_i 84	0.0	84 84

Current activities (Cont'd)

Measurement of the CLIC luminosity spectrum

- Needed for precise cross section measurements
- Understand beam-beam interactions
- Implement models using OO principles
- Provide spectra to users accounting for statistical and systematic errors

Part III

Contributions to Belle II

Computing

Development:

- DIRAC mass production system
- Improve user interface
- Data management: popularity

Operations:

- Interface with Computing Elements: Amazon EC2, GRID
- Service monitoring, machine management
- Data replication

Physics

- Flavour tagging optimization and calibration
- Background rejection
- Luminosity spectrum measurement

Part IV

Future: ILC

Long term work: ILC

- Knowledge of the experimental conditions
- Software packages

d'c d'd e

Other activities

Resonances: 3

Log-enhanced: 1

t-channel: 1

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.