

**BABAR-Belle joint analyses for charmless-
3-Body B decays (B 04)**

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Introduction

- Belle and BaBar have been working together on possible avenues of cooperation between the two experiments
- The two collaborations launched in October 2009 the project of B-Factory book that will summarize ten years of activity in flavor physics
- We are proceeding to perform Babar-Belle joint analyses
- Amplitude, or Dalitz-plot, analyses of charmless 3-body decays (this project) are of particular interest

- The team:

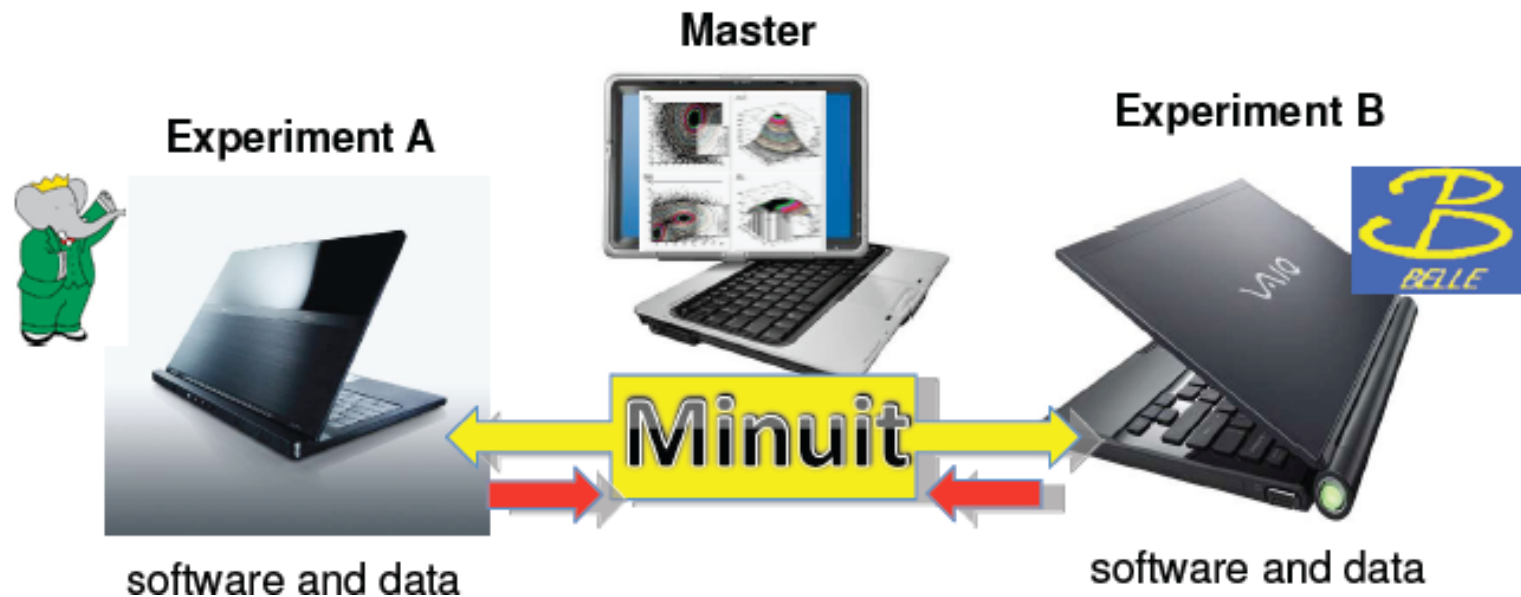
French (and BaBar) Group		Japanese (and Belle) Group	
Name	Affiliation	Name	Affiliation
Eli Ben-Haim (leader)	LPNHE-Paris	Sakai Yoshihide (leader)	KEK
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Yu Nakahama	LAL	Gagan Mohanty	Tata instit. - India
Bertrand Echenard	Caltech		
Mathew Graham	SLAC		
Homer Neal	SLAC		
Tom Latham	Warwick		

Joint charmless 3-body DP analyses

- These analyses allow to study a significant part of the B factories physics program (e.g. CKM angles, searches for New Physics)
- In general: limited by statistics \Rightarrow larger, common dataset could be beneficial
- Besides the benefit of grouping the expertise of the two collaborations, a combined DP analysis has many particular advantages compared to a simple combination of results from two separate analyses:
 - better understanding of the signal composition;
 - better limits on minor components \Rightarrow smaller “model uncertainty”, which is the main systematic effect in most of the charmless DP analyses;
 - shed light on recently observed resonant states whose nature has not yet been understood ($f_X(1300) \rightarrow \pi\pi$, $f_X(1500) \rightarrow KK$);
 - resolving multiple solutions;
 - coordination of the parameterization of resonant decay modes in the signal model (lineshapes, phase conventions, etc), sine qua non for a combined fit
 \Rightarrow makes the results more useful!

A tool for joint *BABAR*-Belle analyses

- A tool for joint fitting was developed in collaboration with René Brun et al. (paper in preparation)
- Interface to Minuit that runs two slave machines, one with the BaBar code and data, another with the Belle code and data
- the tool is fully operational: tested with 3 remote machines, validated using simulated datasets



- Bertrand Echenard (Ryosuke Itoh): fitting tool coordinator for BaBar (Belle).

Funding required

Funding from France				
Description	€/unit	Nb of units	Total (€)	Requested to: ¹
Visits of French team to Japan	150/day	30 days	4500	IN2P3
Travels to Japan	1000	3 travels	3000	IN2P3
2 Travels for 1 week stay each at CERN	800/week	2 weeks	1600	IN2P3
Total			9100	
Funding from KEK				
Description	k¥/Unit	Nb of units	Total (k¥)	Requested to KEK
1 Visit of a Japanese team members in CERN and France	20/day	10 days	200	KEK
1 Visit of a Japanese team members in SLAC	20/day	10 days	200	KEK
Travels of a Japanese team members to CERN/ France and SLAC	130	2 travels	260	KEK
Total			660	

Conclusions and perspectives

Joint analyses: a mean to better exploit the data from B-factories and improve their achievements in charmless 3-body DP analyses.

- we have started to work on the analysis of the mode $B^+ \rightarrow K^+\pi^+\pi^-$ and reported progress. Next in the line: $B^0 \rightarrow K_S^0\pi^+\pi^-$
- Ongoing discussions between BaBar and Belle for other possible joint analyses:
 - $K^*\ell\ell$
 - Charm analyses: CKM angle γ , mixing
- Much progress done on the fitting tool (fully operational!)
- The work and publication of joint analyses is expected to be accomplished in the right time to be a part of the B-Factory book.