Consiglio di Sezione
16th July 2014

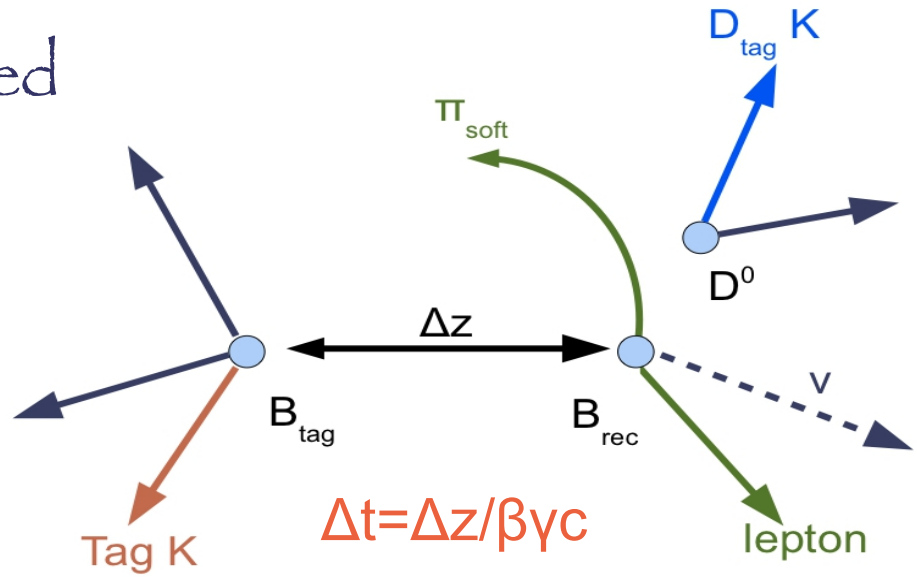
BaBar.dtz: attività locali

- Attività fatte e in corso a Padova
- Stato della collaborazione

SL asymmetry

PRL 111 101802 (2013)
M.Margoni, F.Simonetto

- B^0 Semileptonic Asymmetry measured from Partially Reconstructed $B^0 \rightarrow D^* l\nu$, $D^* \rightarrow \pi_{soft} D^0$ and K Tag

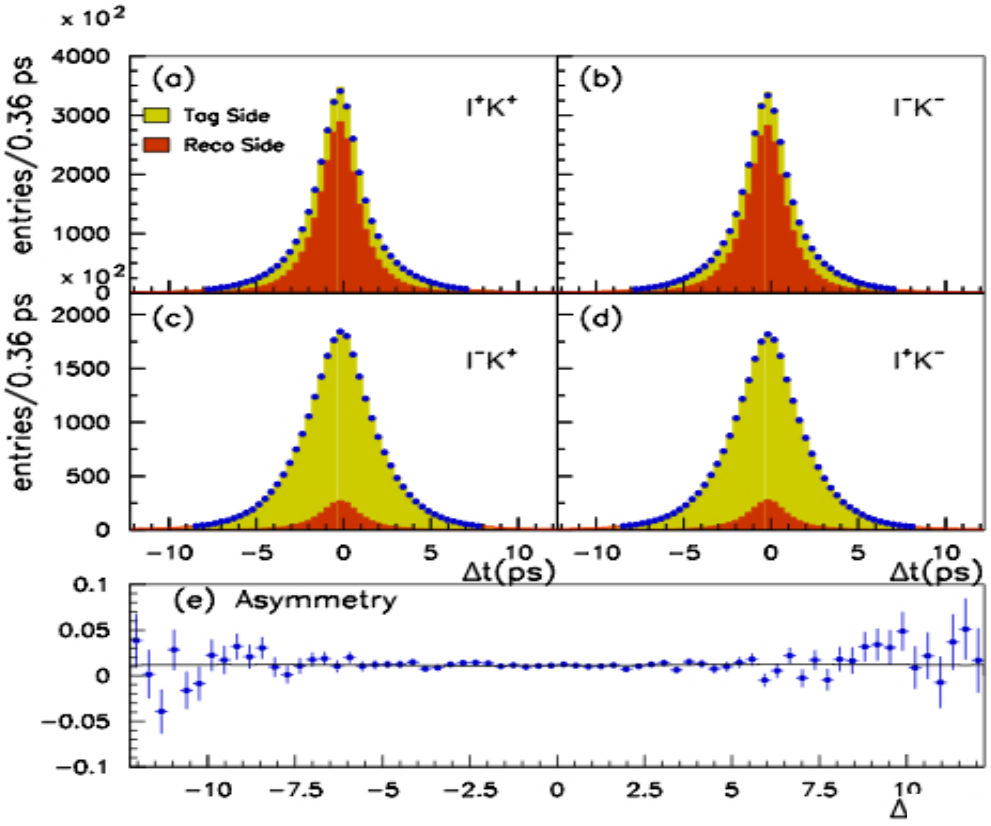


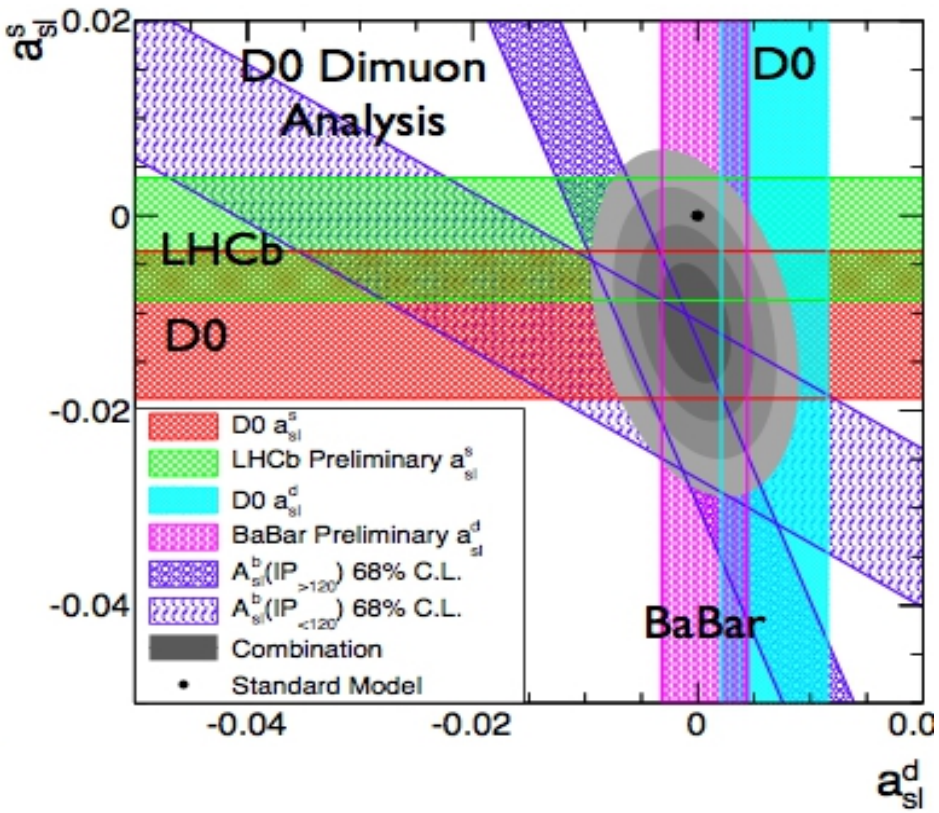
- P.R. B^0 flavor from lepton charge
- Tag B^0 flavor from K charge
- Tag B vertex from K track estrapolation to the e^+e^- Interaction Region

$$A^d_{SL} = \frac{N(\ell^+ K_T^+) - N(\ell^- K_T^-)}{N(\ell^+ K_T^+) + N(\ell^- K_T^-)}$$

- A^d_{SL} from an Extended Maximum Likelihood binned fit to the Δt & $\cos(\theta_{K\text{-Lepton}})$ distributions of the 4 subsamples:
Unmixed (l^-K^+, l^+K^-); Mixed (l^+K^+, l^-K^-)

$B^0\bar{B}^0$ semileptonic asymmetry





$$|q/p|-1=(-0.29\pm0.84^{+1.61}_{-1.78})\times10^{-3}$$

$$A^d_{SL}=(0.06\pm0.17^{+0.38}_{-0.32})\%$$

- Systematics dominated by uncertainty on sample composition

Best single Measurement, in agreement with SM

Long PRD in internal review

Measurement of $B \to D^{(*)}\pi^+\pi^-\ell\nu$ decays

The "gap problem" (current status)

charm state X_c	$\mathcal{B}(B \to X_c \ell\overline{\nu})$
D	$(2.29 \pm 0.09)\%$
D^*	$(5.43 \pm 0.17)\%$
$\sum D^{(*)}$	$(7.71 \pm 0.19)\%$
$D_0^* \to D\pi$	$(0.41 \pm 0.08)\%$
$D_1^* \to D^*\pi$	$(0.45 \pm 0.09)\%$
$D_1 \to D^*\pi$	$(0.43 \pm 0.03)\%$
$D_2^* \to D^{(*)}\pi$	$(0.41 \pm 0.03)\%$
$\sum D^{**} \to D^{(*)}\pi$	$(1.70 \pm 0.12)\%$
$D\pi$	$(0.66 \pm 0.08)\%$
$D^*\pi$	$(0.87 \pm 0.10)\%$
$\sum D^{(*)}\pi$	$(1.53 \pm 0.13)\%$
$\sum D^{(*)} + \sum D^{**} \to D^{(*)}\pi$	$(9.41 \pm 0.22)\%$
$\sum D^{(*)} + \sum D^{(*)}\pi$	$(9.24 \pm 0.23)\%$
inclusive X_c	$(10.98 \pm 0.14)\%$

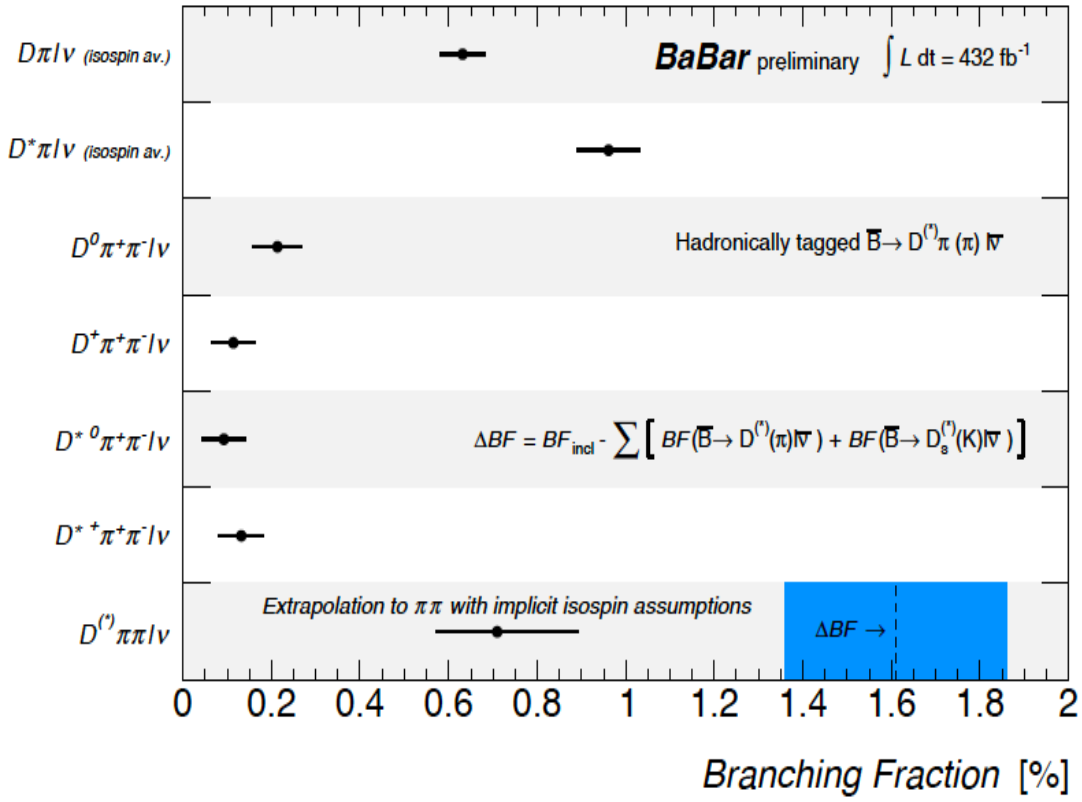
- Incl-Excl gap @ 7σ

Preliminary ICHEP2014
B.Kowalewski, T.Lueck, M.R.

- Background for $|V_{ub}|/|V_{cb}|$ and $B \to D^{(*)}\tau\nu$ analysis
- Fully reconstruct tag B and semileptonic signal decays, **$B \to D^{(*)}\pi^+\pi^-\ell\nu$**
- **$B \to D^{(*)}\ell\nu$**: normalization channels
- **$B \to D^{(*)}\pi^+\ell\nu$**: control sample

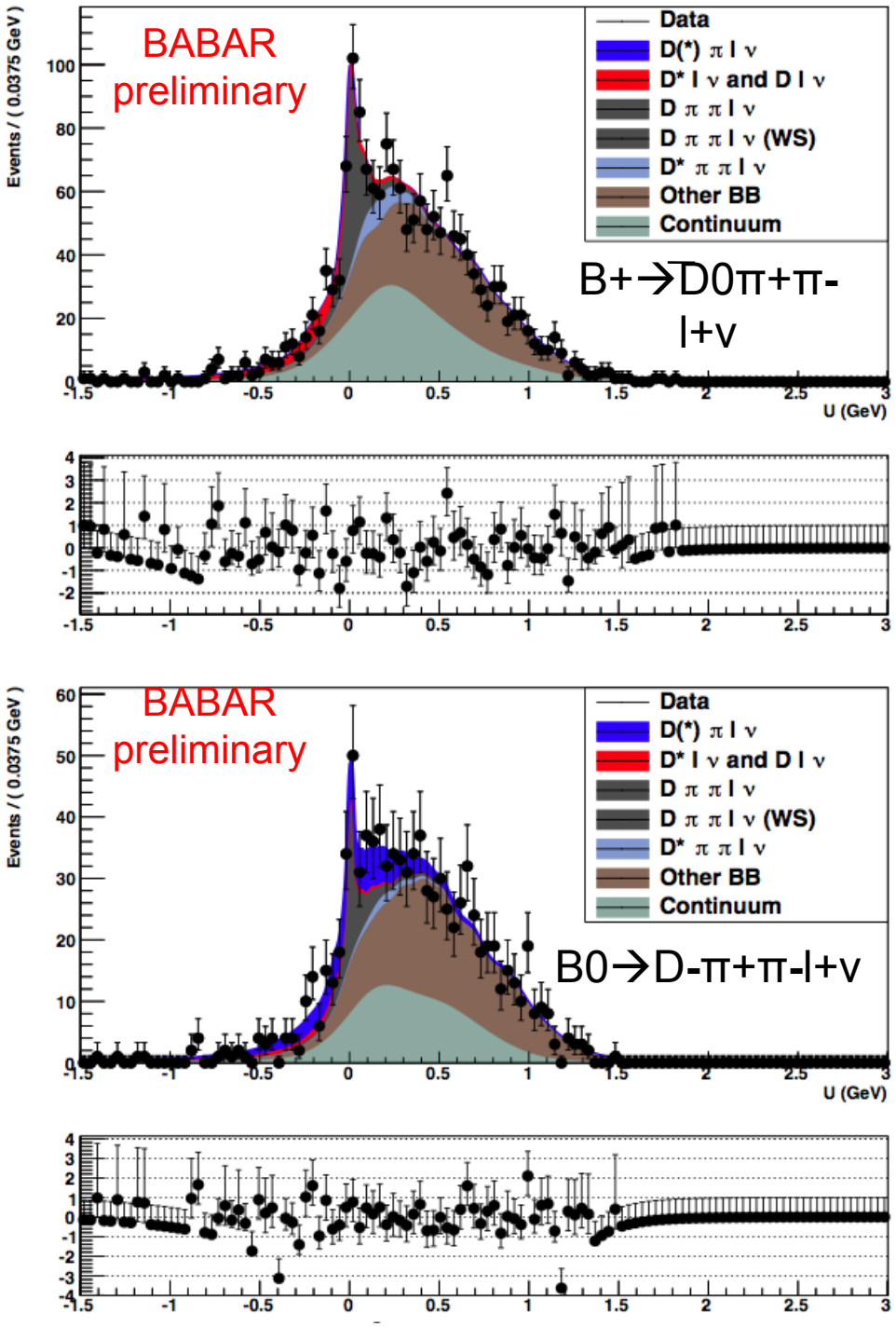
Results

- Averaging B^+ and B^0, significance is
  - 5.1σ for D $\pi^+\pi^-\ell\nu$,
  - 3.5 σ for D* $\pi^+\pi^-\ell\nu$



- Significance of the gap reduced from 7σ to 3σ

(publication in preparation)



U (= Emiss - |**p**miss|)

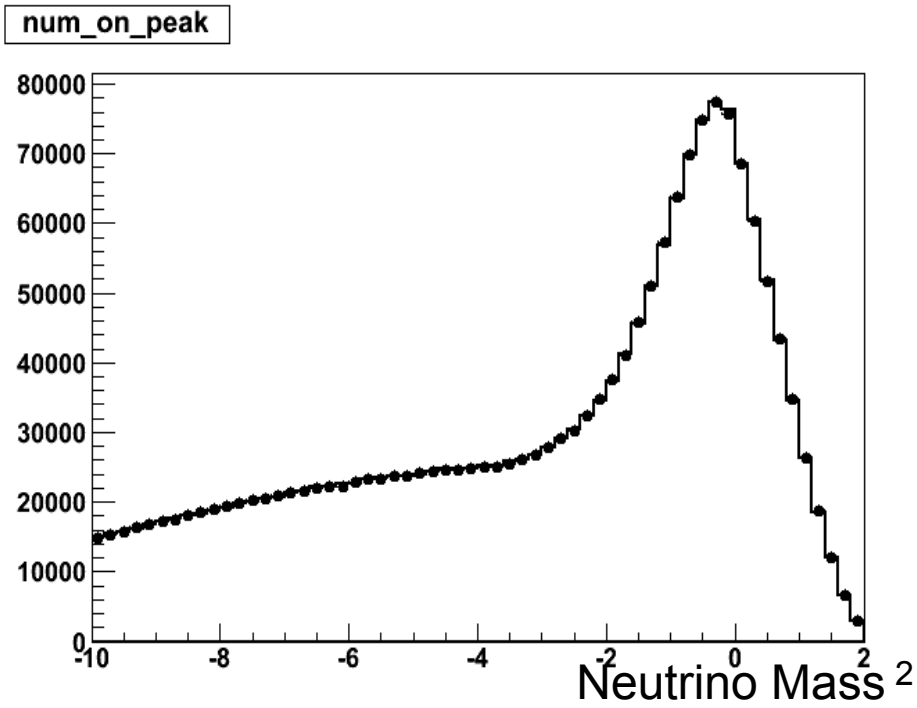
Ongoing analysis: quantum decoherence

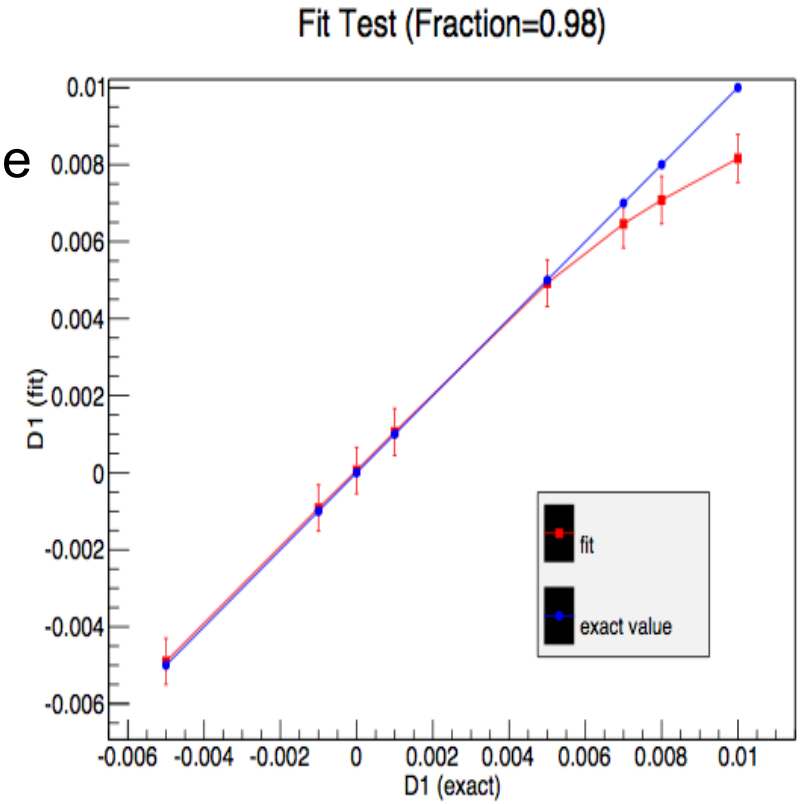
F.Simonetto, M.Margoni
S. Marcantoni (Trieste)

- B mesons from Y(4S) → B$\underline{\text{B}}$ are in a coherent state
- Interaction with weak fields (gravitational field) can induce decoherence
  - Benatti et al.Nucl.Phys B 602 (2001)

– One of the physical motivation for KLOE2 is the study of decoherence in Kaon systems

– Analysis ongoing togheter with theorists from Trieste and a student
  - Sensitivity @0.1% with pure MC



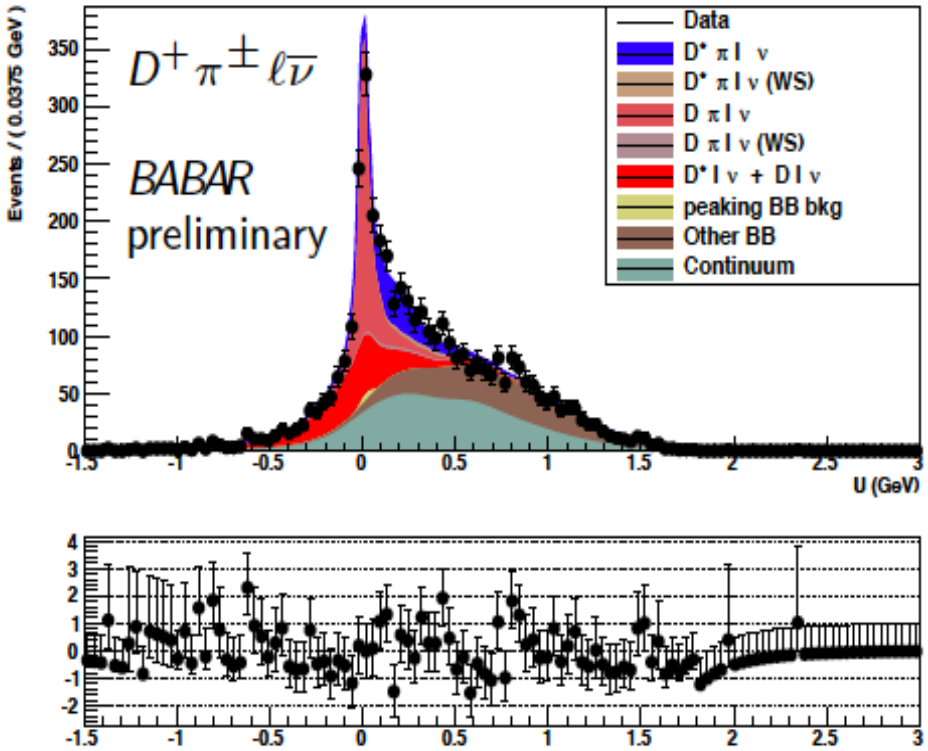


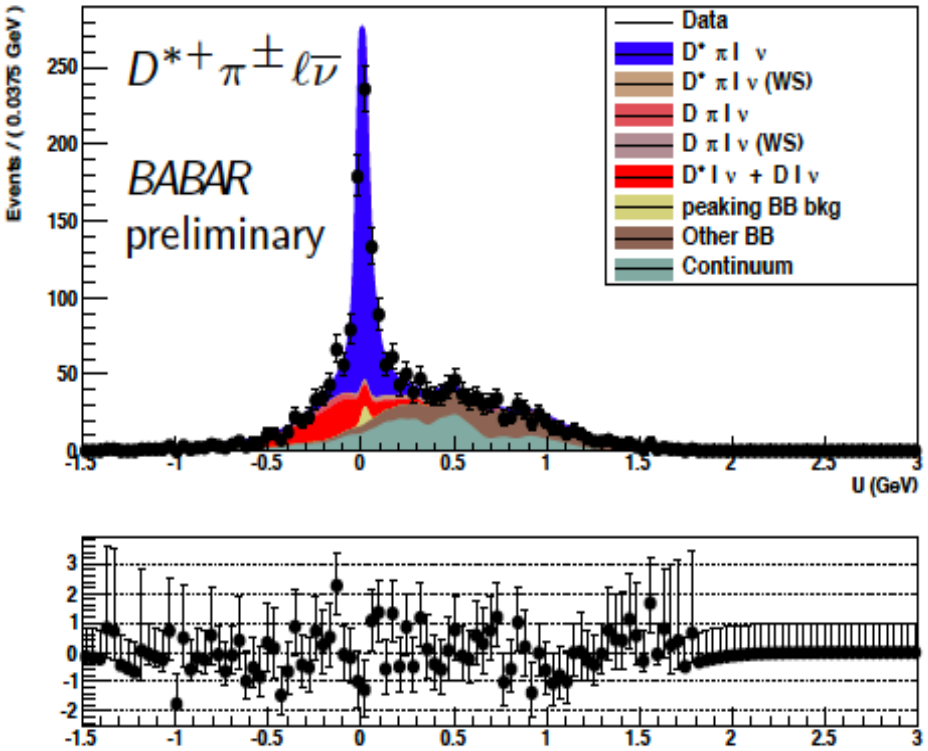
- From this measurement it is possible to extract $\Delta\Gamma_d$:
  – statistical error close to SM prediction

Planned analysis

B.Kowalewski, T.Lueck, M.R.

- First measurements of the $B \to D_1 \ell \nu$ and $B \to D^*_2 \ell \nu$ form factors
  - Recently many theoretical effort on B→D** states: motivated by the BaBar B→D*τν excess over the SM
  - Fully reconstruct the tag B
    - Separate the D** using $\delta M = M(D^*\pi) - M(D)$
  - $D_1 \to D^*\pi$
  - $D_2^* \to D\pi$ & $D^*\pi$

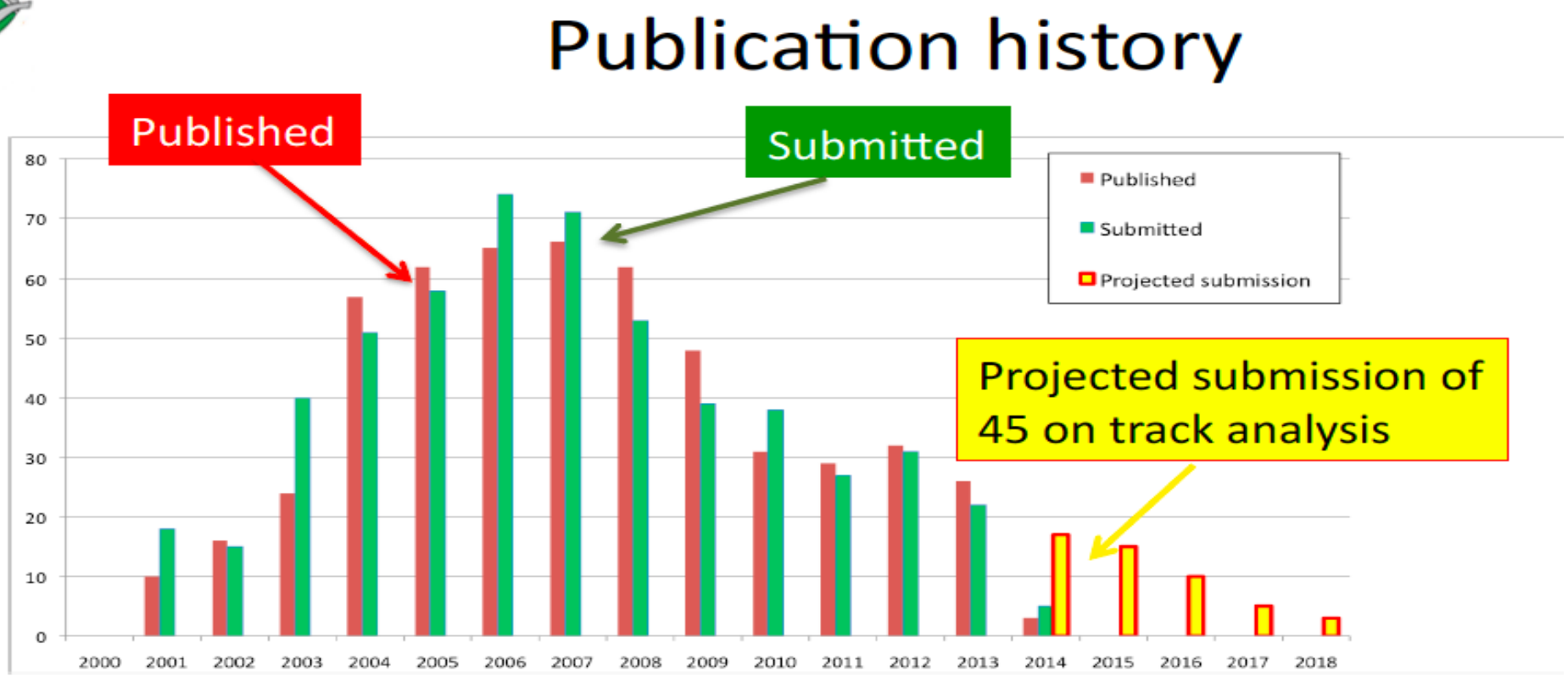




BaBar Collaboration

- Membership Numbers: 72 institutions in 13 countries
  - 280 (205 staff + 42 posdocs + 33 grad.) + 34 stud.assoc.

Status in May 2014



- Significant reduction of submitted papers since last Summer
  - Increasing difficulties to do the last steps on finalizing the analyses for publication

BaBar alle conferenze

- Contributi di BaBar alle conferenze sono ben accolti

2013

Country	0	9	12	15	18	Sum
Canada	1	5	9		1	16
France	5		6			11
Germany	2	1	8			11
India		1				1
Israel					1	1
Italy	7	1	20	1	2	31
Norway	1		1			2
Russia			5		1	6
Spain			2	1		3
United Kingdom			4		1	5
United States	13	3	32	2	2	52
Total	29	11	87	4	8	139

Fino a settembre 2014

Country	0	9	12	18	Sum
Canada	3	2	3	1	9
France		1	4	4	9
Germany		2	3	1	6
Israel	1	1			2
Italy	4	2	9	7	22
Netherlands				1	1
Norway		1		1	2
Russia	2	1	2		5
Saudi Arabia	1				1
Spain		2		1	3
United Kingdom		1	3	4	8
United States	4	2	8	8	22
Total	15	15	32	28	90

10 talk + 4 posters a ICHEP
7 talk a CKM

(molti talks cancellati Per mancanza di speaker)

2013
F.Simonetto "Recent time reversal and CP violation results from BaBar", DESY Seminar
M.Margoni "Semileptonic mixing asymmetry measurements of assl and adsl", FPCP, Rio de Janeiro
G.Simi ""Measurement of D0 mass and D* natural linewidth", FPCP, Rio de Janeiro
F.Simonetto "Mixing-induced CP Asymmetry in semileptonic B-meson decays at BaBar",EPS, Stoccolma
M.Margoni "Recent results on CP and T Violation in B-meson decays at BaBar", WIN2013, Natal, Brazil
M.Rotondo "Constraints on the Higgs sector from B meson decays", 2013 - Higgs Couplings, Freiburg
2014
M.Rotondo "B decays with Leptons: Powerful Probes of New Physics with BaBar", MESON14, Cracovia
M.Margoni "Rare B decays and new physics searches at BaBar", Capri 2014
M.Rotondo "Probing BSM physics with rare B decays", 2014 - Flavour Physics Conference, Vietnam

BaBar in Italia

NA e PG sono fuori, TO compare con 2 ricercatori e 0 FTE

Totale 29 ricercatori: 5.9 FTE

In media:

3 ricercatori / sede

0.6 FTE / sede

20% a testa

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Padova
M. Margoni 20%
M. Rotondo 30%
F. Simonetto 20%

Richieste al CSNI: 6kE per partecipazione a Meetings di collaborazione e conferenze