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Belle II Theory Interface Platform (B2TIP)

Overview

The "Belle II-Theory Interface Platform" is a joint theory-experiment effort to study the potential impacts of the Belle II program. A series of workshops was run from June 2014 culminating as the B2TiP / Belle II Physics Book, summarising many important observables to be measured at Belle II, their experimentally achievable precision and their impact on our understanding of the theory (Standard Model and New Physics).

Report status and current draft (**link**).

This project is an official activity of Belle II, approved by the executive board of the Belle II Collaboration in February 2014.

Workshop Dates

B2TIP Meeting	Meeting Agenda	Belle (II) associated meetings
2018 October 22-26, Belle II Physics week @ KEK	**workshop indico**	BGM October 11-12, B2GM October 15-19
2016 November 15-17, Editorial meeting @ MIAPP Munich	workshop indico	
2016 October 10, Belle II impact plot meeting (Preparation for MIAPP Meeting)	workshop indico	
2016 May 23-25 @ Pittsburgh (local organiser V. Savinov)	workshop indico	
2016 February 22-24 @ LAL, New physics "Follow-up" meeting	workshop indico	
2015 November 9-10 @ PNNL, New physics & EWP WGs	workshop indico	
2015 October 28-29 @ KEK, merged with KEKFF October 26-27 (Tokyo)	workshop indico	BGM October 15-16, B2GM October 19-23
2015 April 27-29 @ Krakow (Local organiser A. Bozek)	workshop indico	
2015 February 23-25, New Physics WG @ KIT (Local organiser U. Nierste)	workshop indico	
2014 October 30-31 @ KEK, merged with KEKFF October 28-29. @ KEK	workshop indico	B2GM November 3-6, BGM November 7-8
2014 June 16-17 @ KEK	workshop indico	B2GM June 18-21, BGM June 22-23

Committees

	Advisory Committee

Organisers and report editors

Emi Kou	LAL
Phillip Urquijo (B2 Physics Coord.)	Melbourne

Ex Officio

Francesco Forti (B2 EB Chair)	Pisa
Thomas Browder (B2 Spokesperson)	Hawaii
Marco Ciuchini (KEK FF Advisory)	Rome
Thomas Mannel (KEK FF Advisory)	Siegen
Tim Gershon	Warwick
Bostjan Golob	IJS Ljubljana
Shoji Hashimoto	KEK
Francois Rene Le Diberder	LAL
Unknown User (zligeti)	LBL
Hitoshi Murayama	IPMU
Matthias Neubert	Mainz
Yoshihide Sakai	KEK
Junko Shigemitsu	Ohio

Working Groups

The WG definitions and their scopes are given below. They are a guide only, some topics will be of higher priority than others.

WG	Overview	Coordinators

WG1
 	
Semileptonic & Leptonic B decays
	• Semileptonic $b \to c \ell \nu$, $b \to u \ell \nu$ transitions: V_{cb}, V_{ub}, New physics.
	  • Exclusive
	  • Inclusive
	• Semileptonic $b \to c \tau \nu$ and $b \to u \tau \nu$ transitions with tau leptons
	• Charged leptonic decays, $B \to \ell \nu$, $B \to \tau \nu$
	• Radiative leptonic decays, $B \to \ell \nu \gamma$
		Guglielmo De Nardo (Naples)
		
		Florian Bernlochner (KIT)
		
		Minoru Tanaka (Osaka)
		
		Frank Tackmann (DESY)
		
		Ryoutaro Watanabe (IBS)
		
		A. Kronfeld (Fermilab)

WG2
 	
Radiative & Electroweak Penguins
	• Radiative
	  • Inclusive radiative decays: $b \to s \gamma$ gamma via inclusive, partial and full reconstruction tagging methods.
	  • Inclusive radiative decays: $b \to s \gamma$ and $b \to d \gamma$ via sum of exclusive methods.
	  • Exclusive radiative decays (polarisation and asymmetries):
	  • $b \to s \gamma$, $B \to K_1 \gamma$, $K^* \gamma$,
	  • $b \to d \gamma$, $B \to \rho \gamma$, $B \to a_1 \gamma$
	  • TCPV in Radiative decays, e.g. $B \to K_S \pi^0 \gamma$ (overlap with bottom)
	• Electroweak
	  • EWP with neutrinos, $B \to K \nu \bar{\nu}$, $B \to \nu \bar{\nu}$
	  • Inclusive dilepton decays via sum of exclusive, and fully inclusive methods: $B \to X_s \ell \ell$
	  • Exclusive dilepton decays with a focus on electron modes: $B \to K \ell \ell$
	• Rare and forbidden
	  • $B \to \ell \ell$
	  • Neutral leptonic decays, $B^0 \to \ell \ell$, $B^0 \to \ell \ell$,
	  • Lepton flavour and number violating decays, $B \to \ell \ell$
		Akimasa Ishikawa (Tohoku)
		
		Saurabh Sandilya (IIT Hyderabad)
		
		Ulrich Haisch (Oxford)
		
		Thorsten Feldman (Siegen)

WG3
 	
alpha = phi_2 & beta = phi_1
	• ϕ_1: $B \to \pi\pi, \rho\pi, \rho\rho$
	• ϕ_2:
	  • precision in $b \to u \ell \nu$,
	  • New phases in $b \to s q \bar{q}$ transitions, $B \to \phi K_S$, $B \to \eta' K_S$, $K_S K_S K_S$,
	• TCPV in Radiative decays, e.g. $B \to K_S \pi^0 \gamma$ (overlap with above)
		Luigi Li Gioi (MPI Munich)
		
		Alessandro Gaz (Nagoya)
		
		Jure Zupan (Cincinnati)
		
		Satoshi Mishima (KEK)

WG4 Gamma = phi_3	• Charm CP Eigenstates, GLW method (Gronau- London- Wyler) e.g. $B \to DK$, $K K$, $\pi \pi$, $K_S \pi^0$ K • Doubly Cabbibo suppressed decays, ADS method (Atwood- Dunietz- Soni), e.g. $B \to DK$, $K \pi$ K • Three body decays, GGSZ Dalitz method (Giri- Grossman- Soffer - Zupan), e.g. $B \to DK$, $K K$ K, $B \to DK$, $\pi \pi$ K • Combined GLW+ADS method e.g. $B \to DK$, $D^* K$, DK^*	Jim Libby (Madras) Yuval Grossman (Cornell) Monika Blanke (CERN)

WG5 Charmless Hadronic B Decay	• Direct CP Violation • [illegible] modes, angular analyses • Charmless hadronic modes, • 2 body [illegible] • 3 body with Dalitz methods, • Hadronic [illegible] decays • QCD factorisation, flavour symmetry breaking	Pablo Goldenzweig (KIT) Bilas Pal (BNL) Martin Beneke (TUM) Cheng-Wei Chiang (NCU) S. Sharpe (Washington)
WG6 Charm	• [illegible] mixing • TCPV in Charm • Direct CPV in Charm • Radiative decays $D \to V \gamma$ • Rare/Forbidden charm decays and NP: [illegible] • Leptonic and Semileptonic charm decays	Giulia Casarosa (Pisa) Alan Schwartz (Cincinnati) Alexey Petrov (Wayne) Alex Kagan (Cincinnati)

WG7
 	
Quarkonium (like)
	• Bottomonia at [illegible]
	• Inclusive baryon and meson production in [illegible] decays
	• Energy scan studies of bottomonia
	• Charmonia, exotic, charmonium-like
	  • below the open-charm threshold
	  • above the open-charm threshold
	• [illegible]-Hadron production at [illegible]
		Roman Mizuk
		
		(ITEP)
		
		Roberto Mussa (Torino)
		
		Chengping Shen (Beihang)
		
		Bryan Fulsom (PNNL)
		
		Christoph Hanhart (Juelich)
		
		Yuichiro Kiyo (Juntendo)
		
		Antonello Polosa (Rome)
		
		S. Prelovsek (Ljubljana)

WG8
 	
Tau, low multiplicity & EW
	• Tau
	  • Lepton flavour violating [illegible] decays
	  • [illegible] properties
	  • Lepton universality
	  • CP Violation
	  • Precision measurements of SM decays
	• Low multiplicity
	• Two Photon Physics
	• Precision electroweak physics ("LEP"-physics)
	• Searches for dark photon in direct production (via kinetic mixing) and exotic final states
		Kiyoshi Hayasaka (Niigata)
		
		Torben Ferber (UBC)
		
		Emilie Passemar (Indiana U.)
		
		Junji Hisano (Nagoya)

WG9 New Physics	*The organisation of this working group is different to the other groups, covering:* • *Benchmark models/points for 5, 10, 50 ab^{-1} data (create a "milestone table; which indicates the goal for 5, 10, 50 ab^{-1} for given new physics models (providing theoretical predictions for various physics processes with those models))* • *Model dependent/independent constraints fit (to prepare the constraints figure for given observables, public code for the fits)* • *Relation to measurements from other experiments (e.g. LHC, neutrino, dark matter, future experiments)*	Florian Bernlochner (Bonn) Ulrich Nierste (KIT) Luca Silvestrini (Rome) Jernej Kamenik (IJS Ljubljana) Silvano Simula (Rome 3)

Working group mandate:

- organise the Workshops programs, together with the co-conveners,
- edit the corresponding sections of the KEK report,
- take responsibility for their section of the golden mode chart (split according to experiment, theory and lattice)
- distribute the tasks among group members,
- contact the other working group theory conveners for the common issues,
- contribute to the New Physics WG
- Lattice coordinators (in Blue) are also membesr of the "lattice QCD board". The mandate of the lattice QCD board is to collect the requests and questions from the WGs concerning the potential and perspectives of lattice computations for quantities that are not covered by the other coordinators (including those that may not have been computed before). T. Kaneko (the lattice board secretary) will organize meetings with the lattice coordinators whenever necessary.

Mailing Lists

General	physics-b2tip@belle2.org
Advisory Committee	b2tip-advisory@belle2.org
Working Group Convenors	physics-b2tip-convenors@belle2.org

To be included in the general mailing list, (i) contact Phillip Urquijo if you are not a Belle II member, or (ii) subscribe to the list in Sympa if you are a Belle II member.

Editorial Meetings and other material

- 13 March 2015 agenda link
- Table of golden modes (link).
- B2TiP minutes/proceedings (invenio)

References

- SuperKEKB TDR - Physics Motivation Chapter (2014)
- Belle II TDR (2010)
- Physics at Super B Factory (2010)

File	Modified
PDF File belle2-note-0021.pdf	May 31, 2016 14:52 by Andreas Gellrich
Microsoft Powerpoint Presentation BelleII_Physics_B2GM_Summary_B2TIP.pptx	May 31, 2016 14:49 by Andreas Gellrich
PDF File Charmoniumchapter_26oct.pdf	May 31, 2016 14:26 by Andreas Gellrich
PDF File FirstPhysicsTFNote.pdf	May 31, 2016 14:52 by Andreas Gellrich
PDF File SuperKEKBReport.pdf	May 31, 2016 14:25 by Andreas Gellrich

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