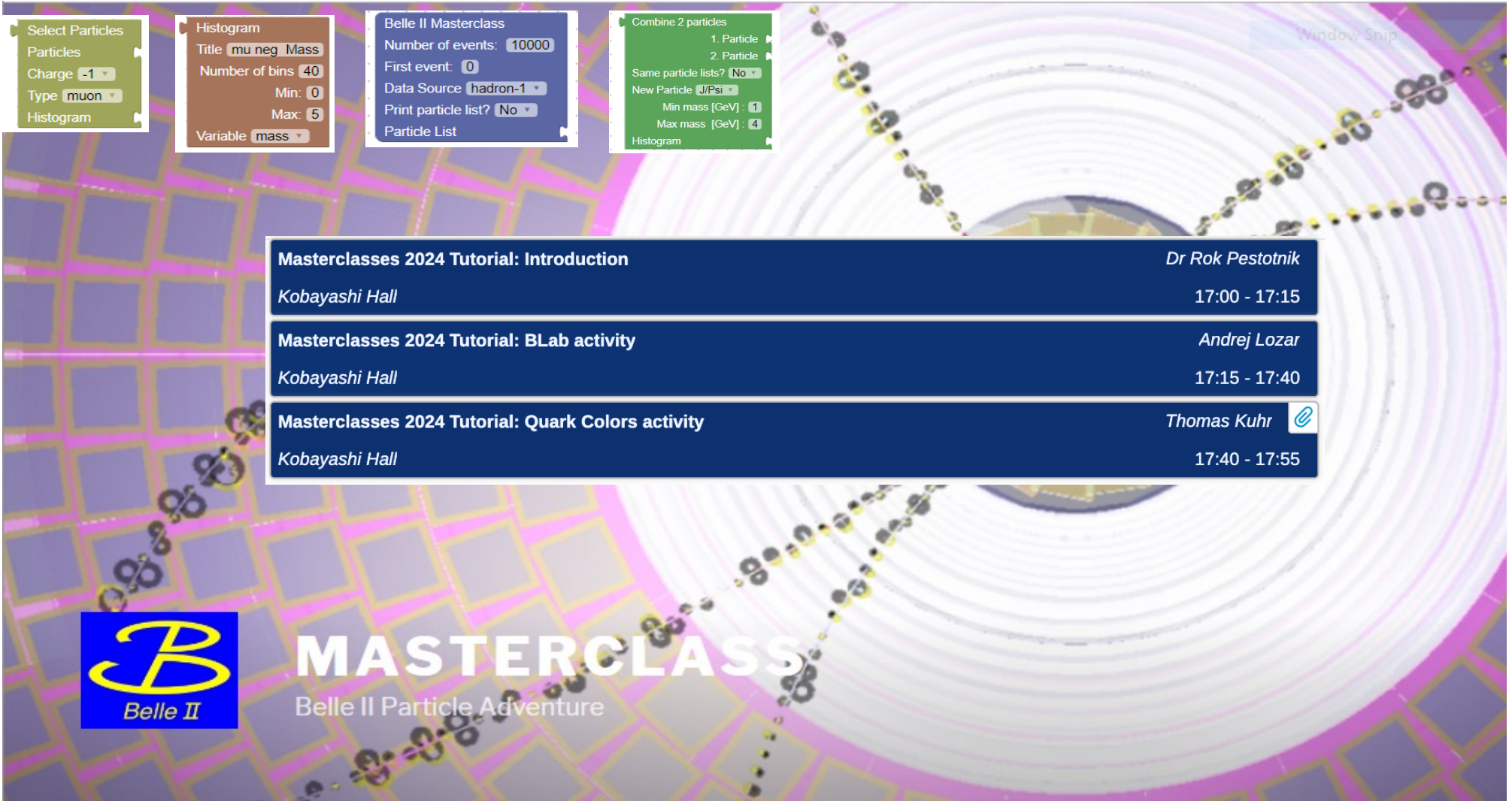




Belle II Masterclass QA

Rok Pestotnik, Jožef Stefan Institute, Ljubljana



The screenshot displays the Belle II Masterclass software interface. It features several panels for configuring histograms and event selection. The 'Select Particles' panel shows 'muon' selected. The 'Histogram' panel shows 'mu neg Mass' as the title and 'mass' as the variable. The 'Belle II Masterclass' panel shows 10000 events and 'hadron-1' as the data source. The 'Combine 2 particles' panel shows 'J/psi' as the new particle. The background shows a particle detector reconstruction with tracks and vertices.

Masterclasses 2024 Tutorial: Introduction	Dr Rok Pestotnik
Kobayashi Hall	17:00 - 17:15
Masterclasses 2024 Tutorial: BLab activity	Andrej Lozar
Kobayashi Hall	17:15 - 17:40
Masterclasses 2024 Tutorial: Quark Colors activity	Thomas Kuhr 
Kobayashi Hall	17:40 - 17:55

 **MASTERCLASS**
Belle II Particle Adventure

IMC Program support - JENIFFER2 project (H2020 MSCA RISE)

BELLE II IMC in 2024 total 21 groups

Planned events:

- EU: regional coordinator [Ezio Torassa](#)
 - EU1: Tue., Mar. 5, 2024, 16:00-17:00 CET – 2 groups
 - EU2: Wed., Mar. 13, 2024, 16:00-17:00 CET – 3 groups
 - EU3: Tue., Mar. 26, 2024, 16:00-17:00 CET – 6 groups
 - EU4: Fri., Feb. 23, 2024, 16:00-17:00 CET – 1 group
- JP: regional coordinator: [Makoto Takizawa](#)
 - March 30 (Sat.) – 3 groups
- US : regional coordinator: [Jake Bennett](#)
 - US1: Tuesday, Mar. 5, 2024, Belle II event – 2groups
 - US2: Thursday, Mar. 21, 2024, VC Mar. 22 8am JST, Quarknet event - contact Ken Cecire
- IN: regional coordinator: [James Frederick Libby](#) – 4 groups

Zoom connection for all events: <https://cern.zoom.us/j/62687960708?pwd=dWhPNEtkTy8vVIR5QzZVYVpwb2Zkdz09>

Content:	EU1	Total no. of students	EU2	Total no. of students	EU3	Total no. of students	EU4 (no videoconf.)	Total no of students
Coordinator:	@Giulio Dujany		@Ezio Torassa		@Thomas Kuhr			
CR contact	@Shohei Nishida		@Taichiro Koga		@Hiroyuki Nakayama			
Total Participants								
	JSI, Ljubljana Exercise 1 @Marko Bracko	20	IPHC Strasbourg Exercise 1 @Isabelle Ripp-Baudot @Giulio Dujany	25	INFN/Univ. Padova Exercise 1 @Ezio Torassa	104	INFN/Univ. Napoli Exercise 2 @Giovanni Gaudino	40
	AANL Yerevan, Armenia Anna Grigoryan @Gevorg Karyan	30	Munich @Johanna Haeusler @Thomas Kuhr	30	INFN/Univ Torino @Umberto Tamponi	30		
			Bonn Exercise2 @Florian Bernlochner Barbara Valeriani-Kaminski , Maike Hansen	25-30	INFN/ Roma Tre Exercise 2 @Antonio Passeri	45		
					INFN/Univ. Pisa Exercise 1 @Francesco Forti @Stefano Bettarini	40		
					CPPM/IN2P3 @Justine Serrano	25		
					Uppsala Exercise 2 @Martina Laurenza	20		



Event	IN	Total no. of students	US	Total no. of students	JP
Moderator:					
KEK CR contact					
Total Participants					
1.	IIT Bhubaneshwar (IR Seema Bahinipati @ Seema Bahinipati)	20-30	University of Mississippi @ Jake Bennett	60-100	KEK
2.	IIT Hyderabad (contact: Saurabh Sandilya saurabh@phy.iith.ac.in @ Saurabh Sandilya)	20-30	Virginia Tech @ Leo Piilonen	50-60	Nagoya University
3.	IIT Jodhpur (Jitendra Kumar) Email: jkumar@iitj.ac.in @ Jitendra Kumar	20-30			Nara Women's Univ. High School
4.	IISER Mohali (IR Vishal Bhardwaj) @ Vishal Bhardwaj	20-30			



Planned Participation:

<https://confluence.desy.de/display/BI/IMC+2024>



Video conference

Regional coordinators responsible to find the crew: for moderators and KEK contact – KEK coordinator nishida.shohei@kek.jp

Young moderators are very welcome. -> contact regional coordinator

Event:	EU1	EU2	EU3
Moderator:	Giulio Dujany	Ezio Torassa	Thomas Kuhr
KEK CR contact	Shohei Nishida	Taichiro Koga	Hiroyuki Nakayama



EVENT PROGRAM

Tailor to your needs – common video conference at the end



- Create an indico page and ask participants to register
- Collect permissions to take photos & record videos for PR and collaboration use in advance (**General Data Protection Regulation (EU) [2016/679](#)**)
- Prepare a survey at the end of the event
- Ask students to bring their notebooks to minimize the infrastructure needs
- Test the video connection and the audio quality
- Prepare Certificates for attendees
- Make satisfaction survey at the end (you can use Indico for it.)
- Post photos for Outreach use (social media , etc.)

8:45	Registration
9:00 - 9:15	Introduction
9:15 - 10:00	Physics of elementary particles
10:00 - 10:45	Experimental methods in high energy physics
10:45 - 11:15	Belle II Virtual reality
11:15 - 11:45	Introduction Data Analysis
12:00 - 13:00	Lunch – meet the HEP researchers
13:00 - 16:00	Belle Data Analysis + preparation of the presentations
16:00 - 17:00	Joint Video conference



RESOURCES FOR PRESENTATIONS

Use the resources/presentation from previous years:

<https://confluence.desy.de/display/BI/Belle+II+Masterclasses>

Language	Events/ presentations
Italian	BelleII masterclass_it_imc2019.docx
French	IMC 2019
Slovene	IMC 2019
German	German Masterclasses

- Intro videos for the Belle II Lab exercise

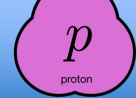
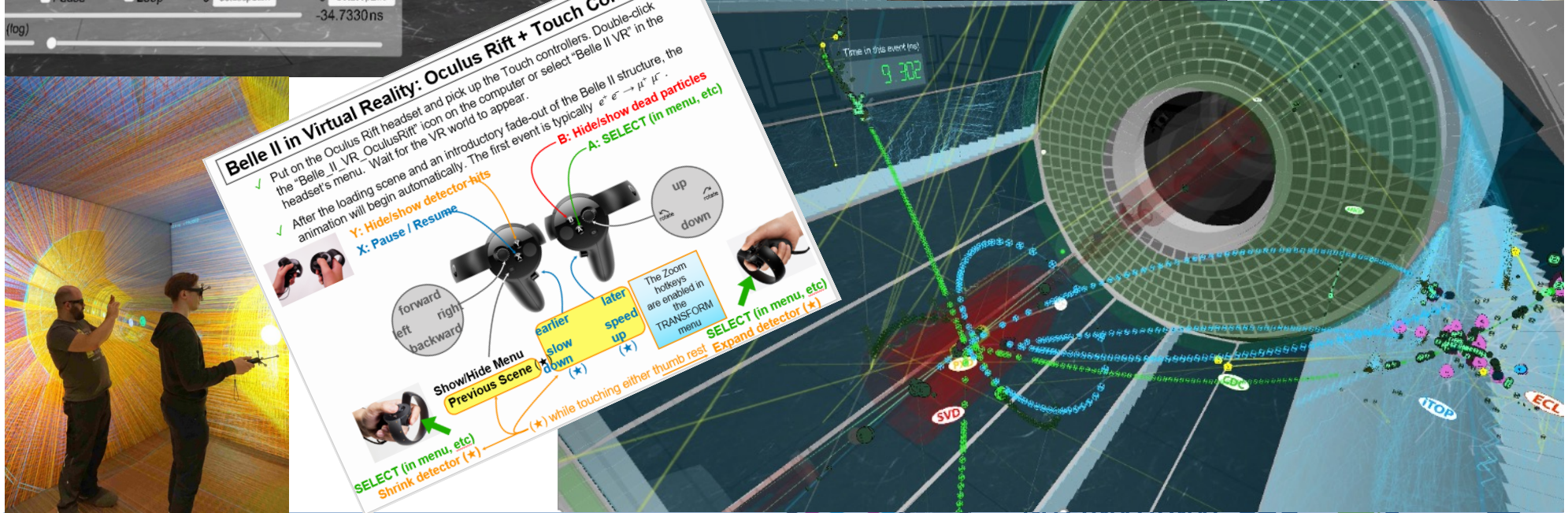
You tube video introduction

- Start: https://youtu.be/q6M2_dnp3pl
- Particle distribution: https://youtu.be/q6M2_dnp3pl
- J/psi to mumu: <https://youtu.be/xUYmXoPfZOU>
- J/psi to ee: <https://youtu.be/3TGsHJ8j8pE>
- Fit: <https://youtu.be/wWbjWYHVLU>
- B to J/psi K <http://youtube.com/watch?v=e-GErqzY3HM>

Upload or link your presentations for the future use



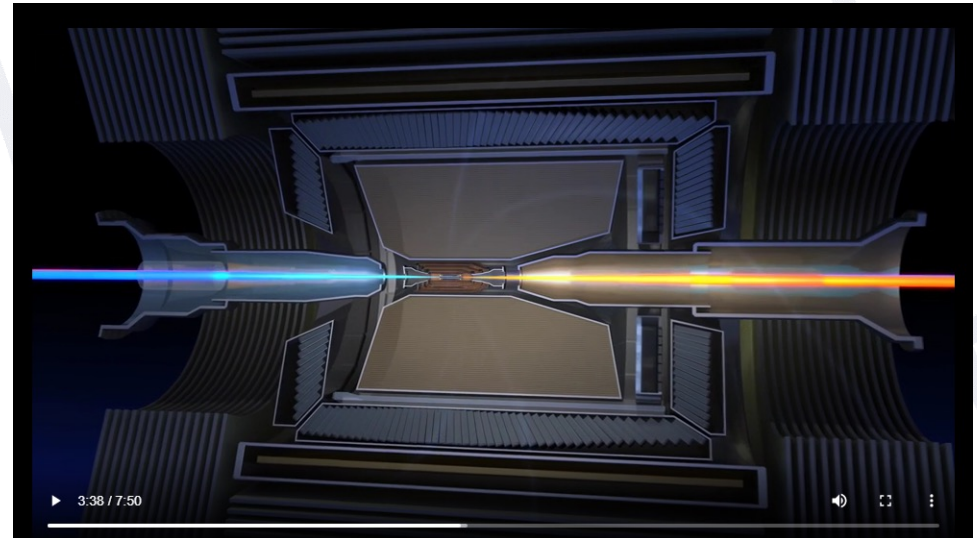
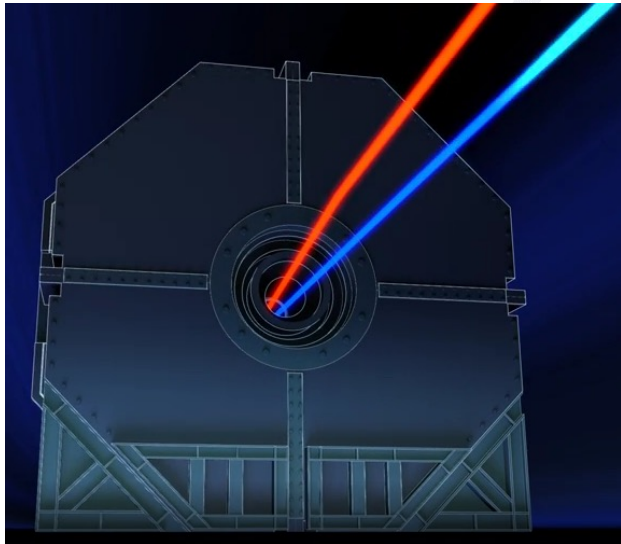
[https://store.steampowered.com/app/810020/Belle II in Virtual Reality/](https://store.steampowered.com/app/810020/Belle_II_in_Virtual_Reality/)



INTRODUCTION VIDEOS

Video material

http://www1.phys.vt.edu/~piilonen/movies/KEK_eng_short_1029.mp4

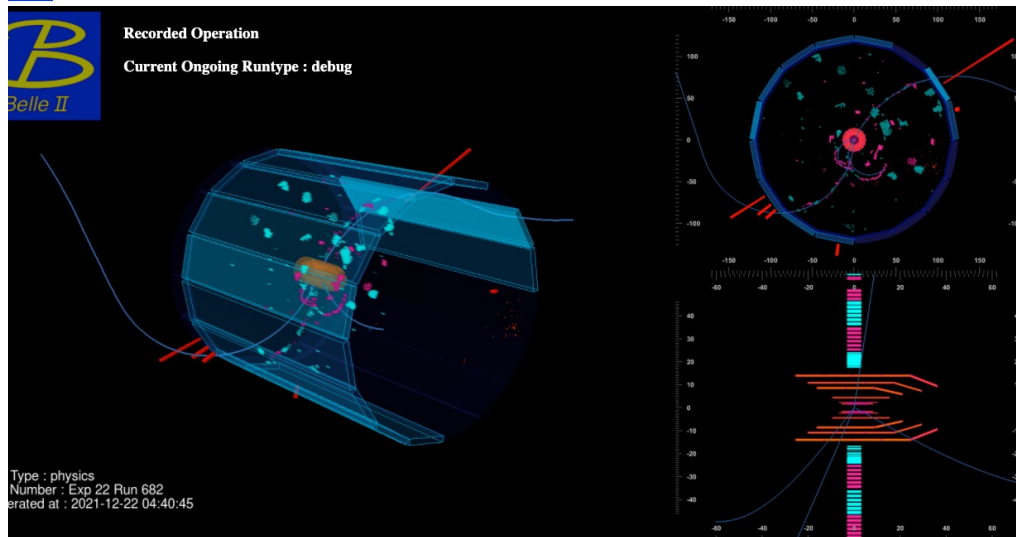


BELLE II EVENT DISPLAY

<https://evdisp.belle2.org/>

<https://display.belle2.org/>

Belle II Online Event Display (Replay)



Belle II

Welcome to the Belle II Event Display with Phoenix - v0.2.0

Event Display
Display the events with the simplified detector geometry.
Show

Detector
Show the Belle II detector with full, detailed, geometry.
Show



INTERNATIONAL
MASTERCLASSES
hands on particle physics

Hands-on exercises

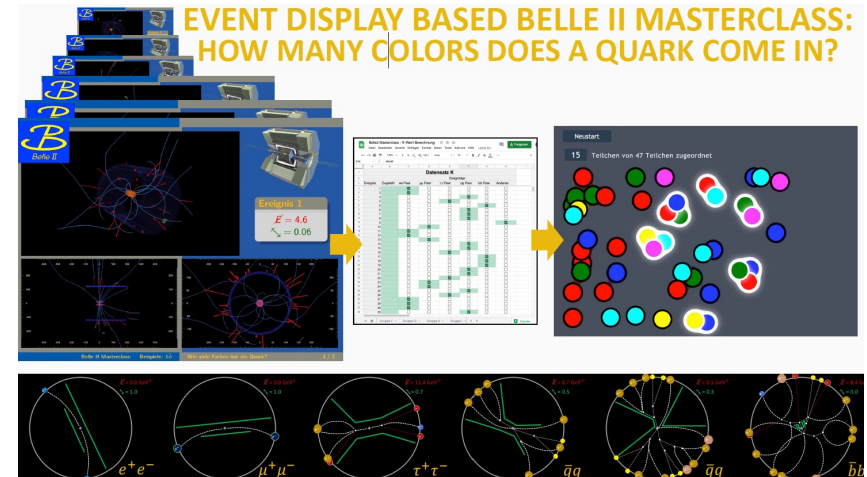
Two activities:

- Measure quark colors
 - similar to LHC experiments
 - <https://belle2.ijs.si/public/home/quark-colors/>
 - Limited sets of events
- Standard level: Belle II Lab - Discovery of new particles based on the invariant mass distribution
 - analysis of 5 mio. events from Belle and Belle II
 - <https://belle2.ijs.si/public/home/reconstruct-b-mesons/>

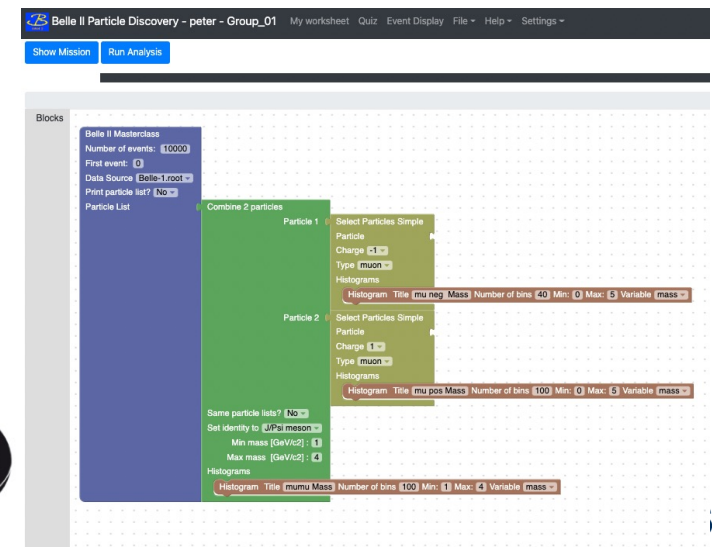
No local installation needed:
all materials are online for both exercises

If you prefer, setup your own server :
<https://stash.desy.de/projects/B2OUT/repos/masterclass/browse>

Bonn University



Jožef Stefan Institute



SUPPORT MATERIALS FOR INSTRUCTORS & TUTORS

Belle II IMC 2024 page:

<https://confluence.desy.de/display/BI/IMC+2024>

Belle II Masterclass web page :

<http://masterclass.belle2.org>

Organisation section of International Masterclasses web:

https://physicsmasterclasses.org/index.php?cat=local_organisation&page=organisation

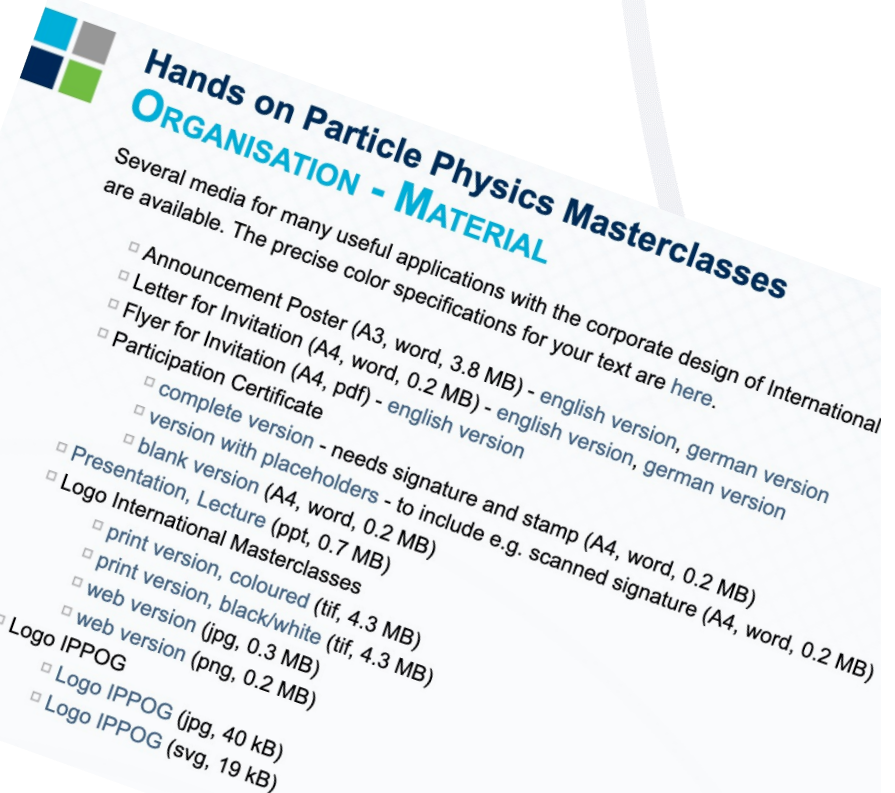
IMC Media templates page: <http://cern.ch/go/mj8H>

Tutorial videos from 2021:

20210212_BelleIIMasterClass-Conference-and-quiz.mp4

20210212_BelleIIMasterClass-Introduction.mp4

<BelleIIMasterClass-Demonstration.mp4>



Hands on Particle Physics Masterclasses
ORGANISATION - MATERIAL

Several media for many useful applications with the corporate design of International are available. The precise color specifications for your text are here.

- Announcement Poster (A3, word, 3.8 MB) - english version, german version
- Letter for Invitation (A4, word, 0.2 MB) - english version, german version
- Flyer for Invitation (A4, pdf) - english version
- Participation Certificate
 - complete version - needs signature and stamp (A4, word, 0.2 MB)
 - version with placeholders - to include e.g. scanned signature (A4, word, 0.2 MB)
- Presentation, Lecture (ppt, 0.7 MB)
- Logo International Masterclasses
 - print version, coloured (tif, 4.3 MB)
 - print version, black/white (tif, 4.3 MB)
 - web version (jpg, 0.3 MB)
 - web version (png, 0.2 MB)
- Logo IPPOG
 - Logo IPPOG (jpg, 40 kB)
 - Logo IPPOG (svg, 19 kB)



JOINT VIDEO CONFERENCE

Moderator responsible for moderation and timing

2min	Opening statement
4x5min	Sites selects one of the results from exercises We hope to have both exercises presented Nominate 2 students for max. 5 min presentation
5-10 min	Connection to Belle II control room and talk with the shift crew KEK contact – short introduction , state of the data taking, Q&A from audience
15 min	Particle quiz
10 min	Wrap Up talk

Quiz:

- Questions: asked by moderator (u:tutor, p:gdpr)
- <https://belle2.ijs.si/masterclass/admin/quiz.php>
- Answers: collected by Voting system
<https://belle2.ijs.si/masterclass/quiz.php>

15 questions -2 categories:

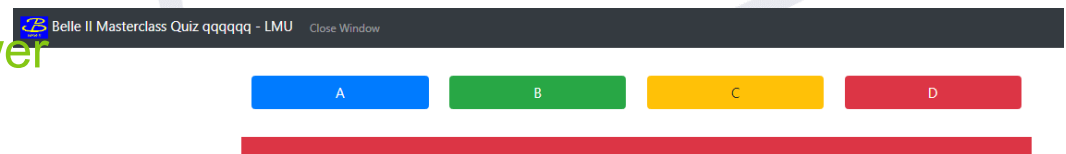
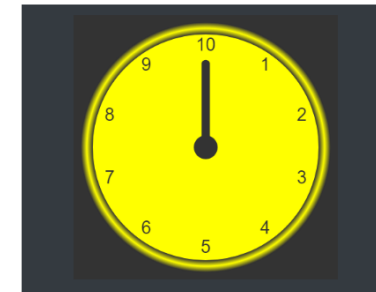
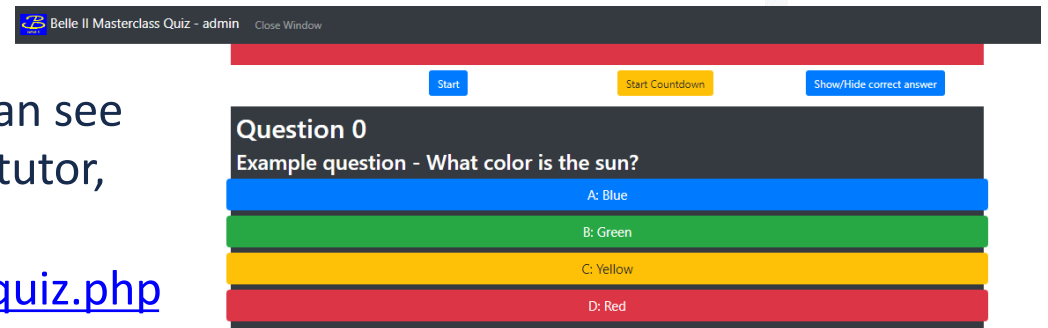
- Science (10x) + Life in Japan (5x)
- Make sure you explain the content in the morning sessions



QUIZ

- Questions: asked by moderator - tutor can see them , but cannot enable the voting (u:tutor, p:gdpr)
- <https://belle2.ijs.si/masterclass/admin/quiz.php>
- Student Voting system
<https://belle2.ijs.si/masterclass/quiz.php>

- Moderator asks the question
- Moderator starts the countdown timer and enables the voting system
- Students vote: after vote submission, they cannot vote for 15 seconds
- Moderator checks the answer statistics
- Moderator shows the correct answer



<https://confluence.desy.de/display/BI/Experimental+particle+physics+quiz>

