



Tracer-EVD 3-Dimensional Event Display for ATLAS Masterclasses



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INTERNATIONAL PARTICLE PHYSICS OUTREACH GROUP

IPPOG Agreement 2021-001

Provision of Level of Effort in the Development of Visualisation Software Applications for the IPPOG Collaboration

BETWEEN

the IPPOG Collaboration
hereafter referred to as 'IPPOG'
Represented by the IPPOG management

on the one hand,

AND

the Georgian Technical University / GTU
hereafter referred to as 'Georgian Team'
represented by Georgian representative in IPPOG collaboration

on the other hand,

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- 1.4 IPPOG will share successful experience and tools through the IPPOG educational network.
- 1.5 This agreement is limited to describing the provision of level of effort in the area of software development and support for its use in IPPOG, without prejudicing other potential contributions in other areas of IPPOG activity.

ARTICLE 2 SCOPE AND VALIDITY

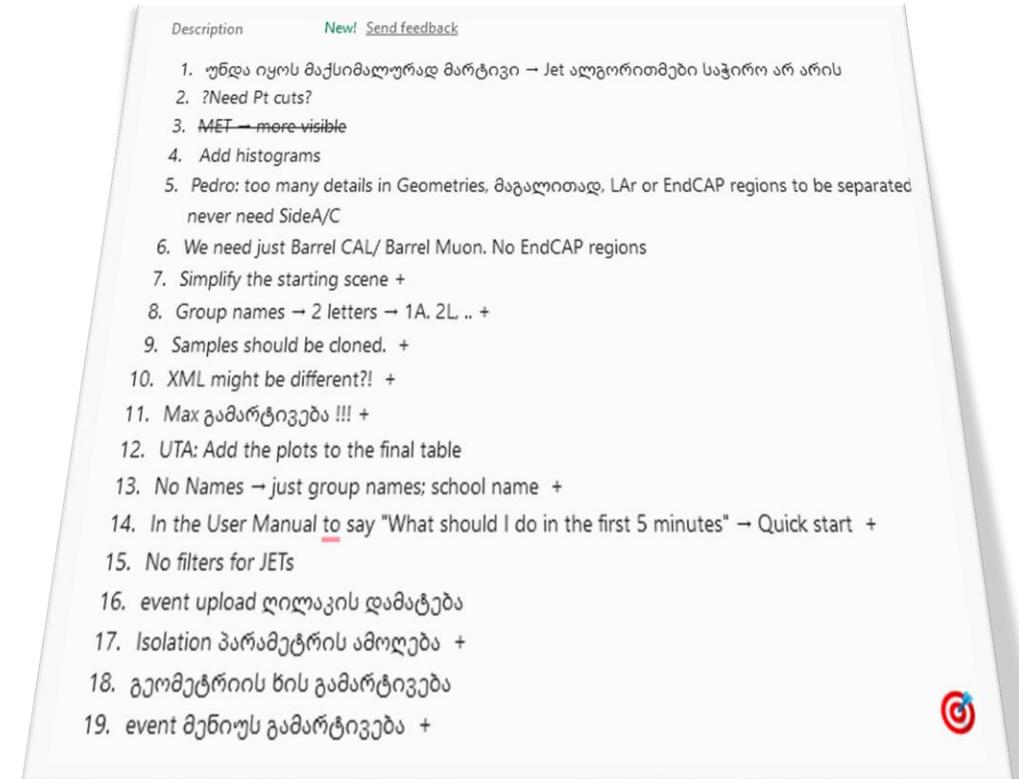
- 2.1 With this agreement, the Georgian Team undertakes to provide effort in the area of software development, including mobile applications, and support as follows:
 - 2.1.1 Browser-based Events 3D Visualisation Display application for the ATLAS experiment;
 - 2.1.2 Browser-based Virtual Reality application for organisation of virtual tours in ATLAS Cavern;
 - 2.1.3 Browser-based Augmented Reality application for cognition of the ATLAS detector;
 - 2.1.4 Browser-based Augmented Reality extensions to printed posters, books and other exhibition materials;
 - 2.1.5 Cognitive 3D gaming applications about Particle Physics.
- 2.2 The functionality and technical requirements of the cognitive software applications for the visualisation will be defined by the IPPOG experts and the steering group of the International Masterclasses.
- 2.3 All human resources will be supported and managed under the responsibility of Georgian Team.
- 2.4 The scope of this agreement can be changed by amending the current agreement, if both parties agree.

ARTICLE 3 BOUNDARY CONDITIONS

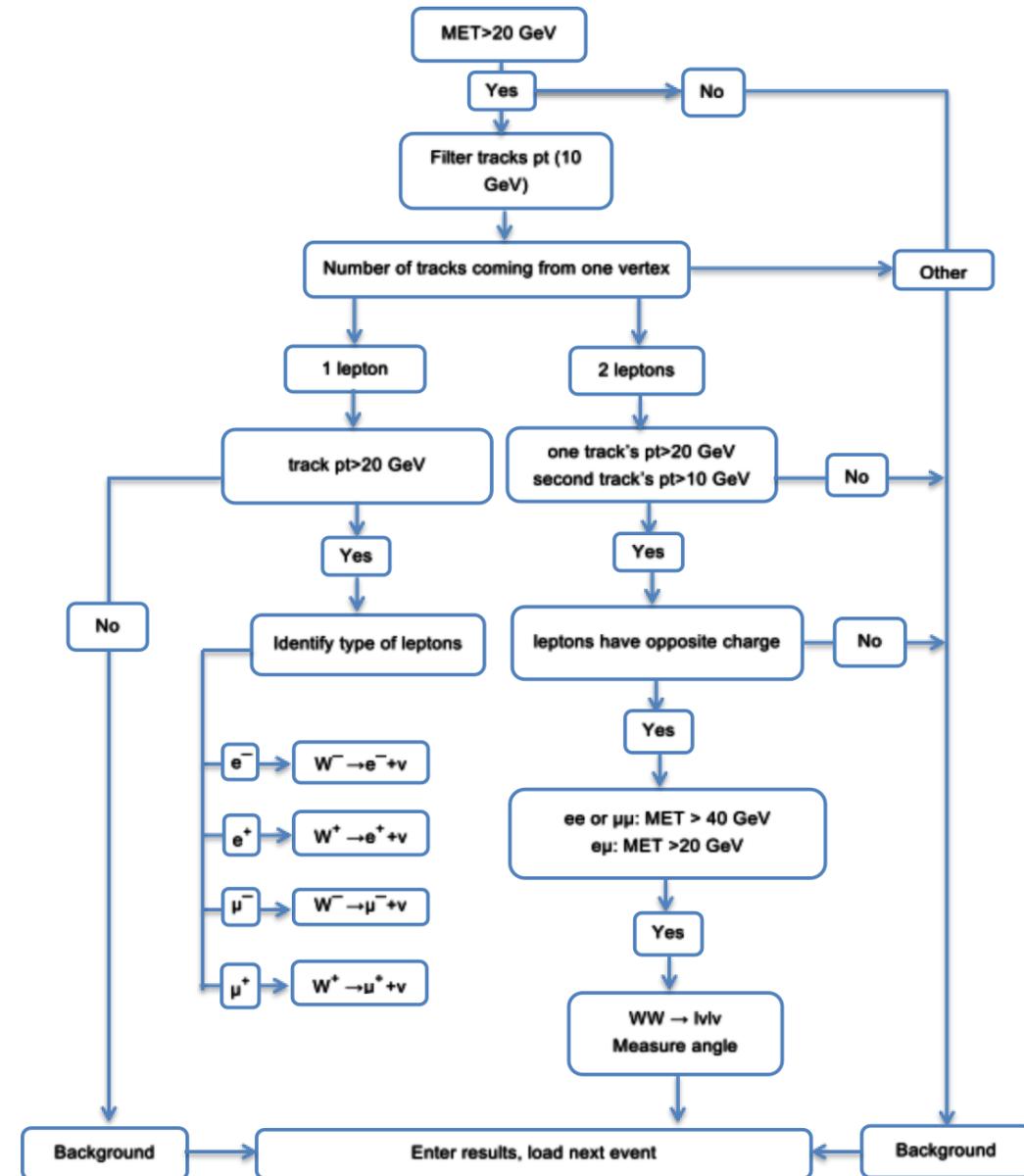
- 3.1 The work shall be carried out in compliance with all guidelines in use for IPPOG.
- 3.4 Georgian Technical University will be responsible for quality control of results delivered to IPPOG.

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- Started in 2022
- In 11th of July 2022 First draft was presented to IMC Steering group
- In 29th of October Second draft was presented to IMC Steering group
- Thanks to Uta, Ken, Farid, Steve, Pedro for the feedback



- TracerEVD is the 3D ATLAS event display application with extended functionalities and features
- The application ensures the high Performance and Quality of the 3D scenes together with the standard functionalities of the ATLAS event displays
- It is a web-based application reachable from browsers through the link: <https://tracer-evd-mc.web.cern.ch/>
- In the Draft-1 we realized the standard IPPOG masterclass for searching the basic particles, WW^+ / WW^- , the Higgs bosons



I. Log in as Teacher:

- Identify date and the Name of the host for the Masterclasses
- Create the new Table for the Masterclass Session

II. Log in as Student:

- Enter student information (First name, last name, school, Country, host)
- Choose a group A, B, C... (Students should be informed by tutors which group to select?)
- Choose Masterclass problem
- Press “start” to start analyzing events

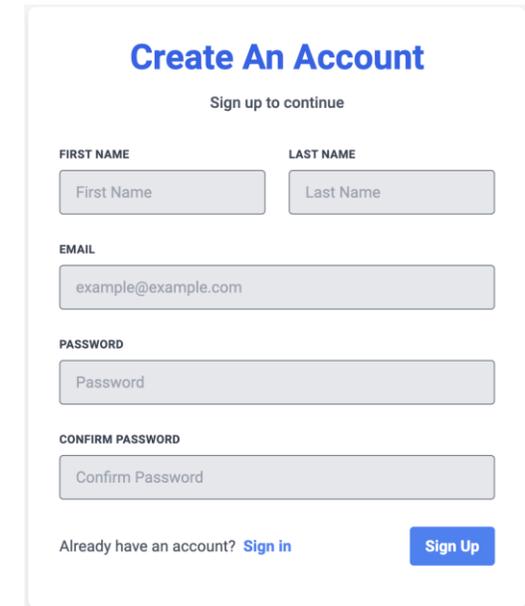
III. Event Analyses:

- Use event menu to apply filters
- Mark event type in W/Z path table
- Press “Next” to load next event
- Press “submit result” to end masterclass process

IV. Checking results

- After finishing event analysis student can check results of current masterclass session. (Table shows host university groups masterclass results for current date)

- Our platform simplifies the registration process for universities to sign up for masterclasses
- To participate in the masterclasses, organizers/teachers must create an account beforehand
- Using the platform, organizers and teachers can create and register a masterclass session for a specific university and date. This is done through a user account that simplifies the process, making it easy to set up the session and begin collecting data during the masterclasses
- Once a masterclass session has been registered, the platform generates a table with unique ID for the session. This table is used to collect data during the masterclasses, allowing organizers and teachers to easily record and track results in one place



Create An Account
Sign up to continue

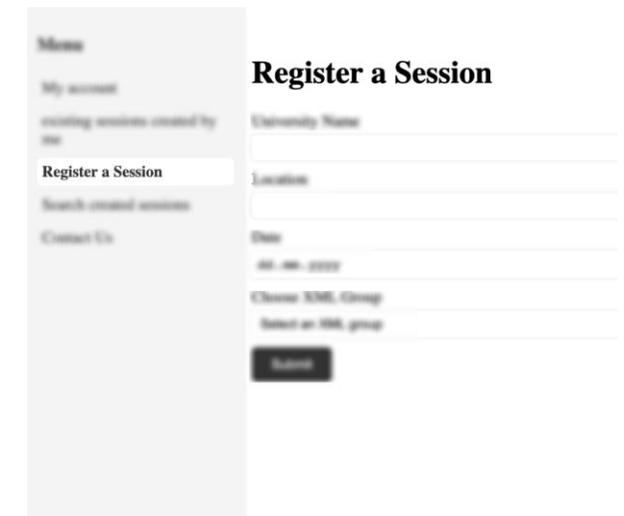
FIRST NAME LAST NAME

EMAIL

PASSWORD

CONFIRM PASSWORD

Already have an account? [Sign in](#)



Register a Session

My account

existing sessions created by me

Register a Session

Search created sessions

Contact Us

University Name

Location

Date

Choose ICM Group

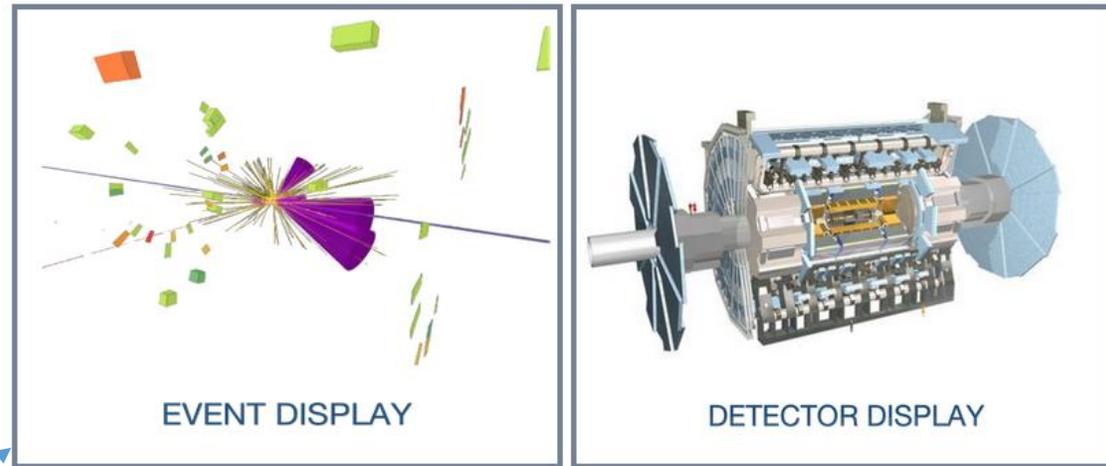
Obligatory fields



The header of the registration form features three logos: IPPOG on the left, 'INTERNATIONAL MASTERCLASSES' in the center, and ATLAS EXPERIMENT on the right. Below the logos is a registration form with several fields: a text input containing '24', a dropdown menu showing 'GTU', another dropdown menu showing 'Group 1A', a 'Choose session date:' label, a date input containing '10 / 28 / 2022', and a dark blue button with a red 'W' and a white 'Z'.

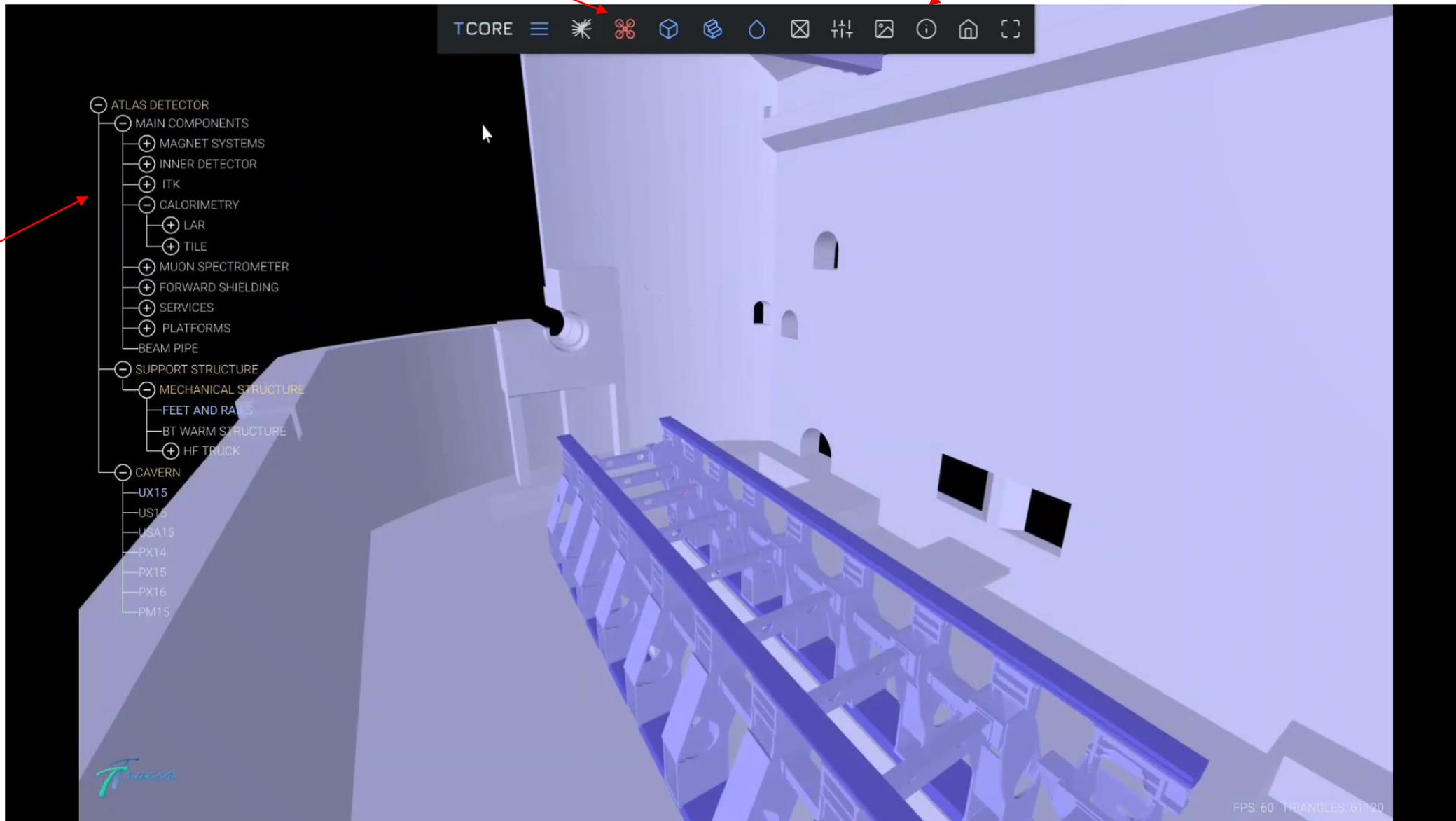
Registration

Branches



Drone Modes

Control Panel



Structural Tree

Virtual Touring

Events Analyses

Control Panel

Geometry Tree

Events

Working Table

Event	e+	e-	M+	M-	Background	WW	Angle	
01	<input type="radio"/>	<input type="checkbox"/>						
02	<input type="radio"/>	<input type="checkbox"/>						
03	<input checked="" type="radio"/>	<input checked="" type="checkbox"/>						
04	<input type="radio"/>	<input type="checkbox"/>						
05	<input type="radio"/>	<input type="checkbox"/>						

Submit result

Next

Group 1A
Host : gtu
Date : 10/27/2022

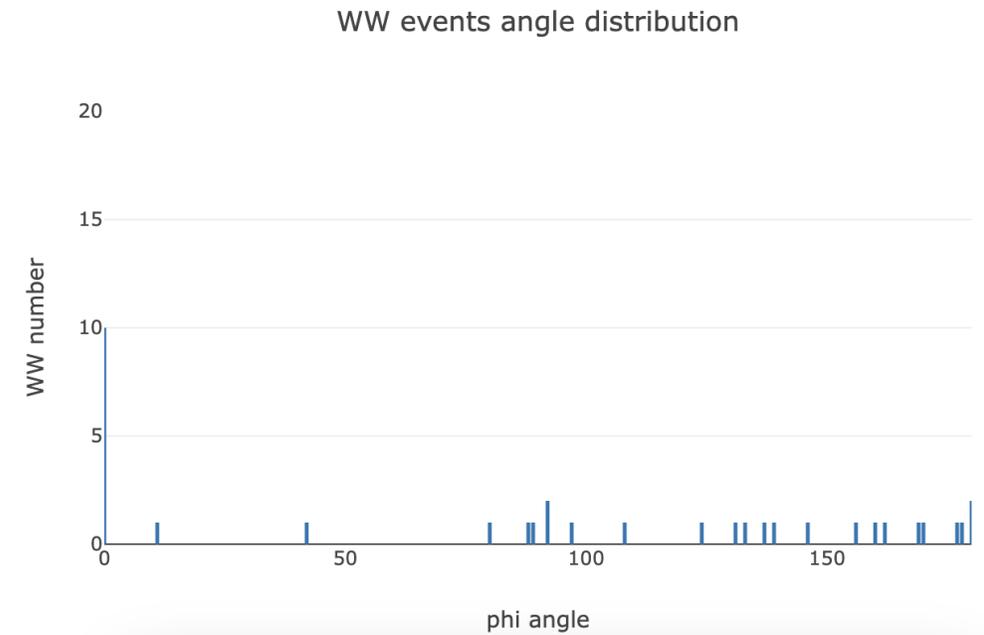
FPS: 61 TRIANGLES: 56324

GTU

Date: 13/03/2023

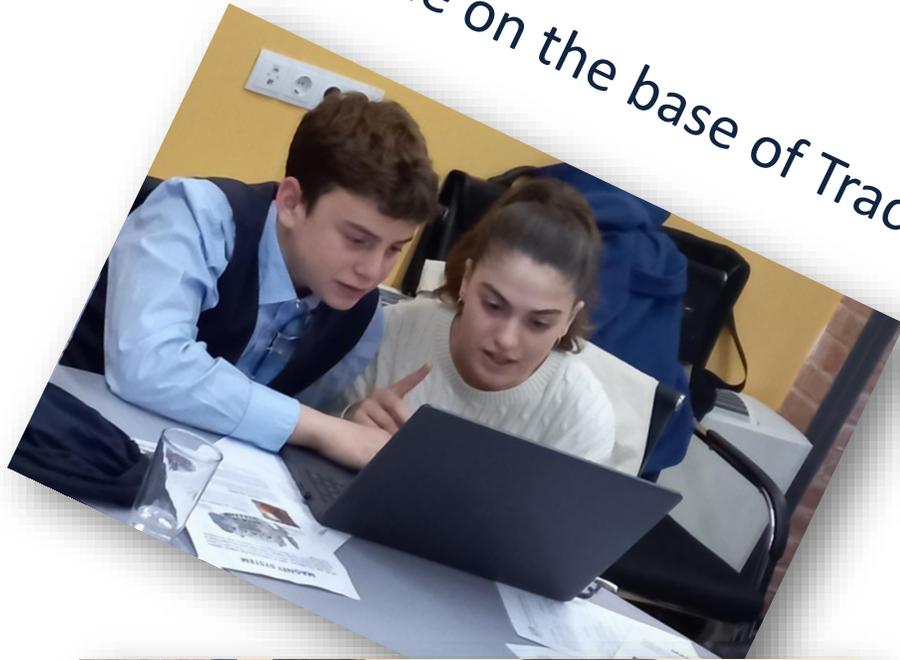
[Download txt file](#)

Group Name	e ⁺ +ν	e ⁻ +ν	μ ⁺ +ν	μ ⁻ +ν	Background	WW	Angle
11A	0	1	0	0	0	3	56; 43; 90;
11B	6	5	7	2	30	0	
11C	8	11	0	0	31	0	
11D	17	6	8	6	34	8	; ; 108; 180; 88;
11E	7	3	2	4	29	5	139; 156; 146; 170; 133;
11F	16	16	6	8	44	10	; ; 180; ;
11G	10	5	6	4	24	1	177;
11H	7	5	8	3	26	1	169;
11K	2	5	1	1	14	0	
11N	6	8	6	4	24	2	178; 92;
11O	0	0	0	0	0	1	;
11P	5	3	7	6	25	4	11; 89; 160; 162;
11Q	6	2	5	6	31	0	
Total Numbers:	116	89	78	66	463	48	



Results Submission

- Done on the base of TracerEVD

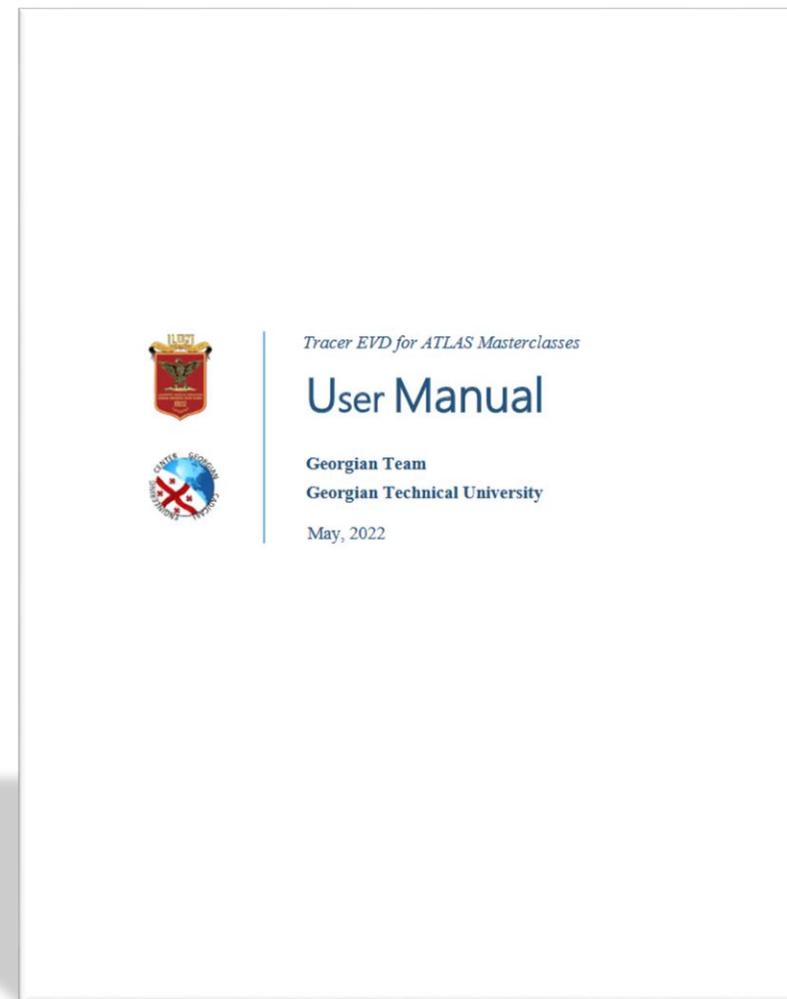


- About 50 students participated
- All of them were joyful with the 3D Applications
- Events analyses are much easier and clear with 3D scenes than the 2D scenes
- TracerEVD results were proved with the results from other IMC, based on the Minevra
- We have estimated application performance having more than 30 parallel sessions
- TracerEVD is now ready for usage. IPPOG has good opportunity to profit
- TracerEVD is now ready for usage. IPPOG has an excellent opportunity to benefit from this



- Next will be the preparation of TracerEVD for the Z boson Masterclasses. We have good input from Farid

Developers team



Application link:

<https://tracer-evd-mc.web.cern.ch>

Thanks!