New version of ALICE MasterClasses

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ALICE MasterClasses

ALICE MasterClass is a part of MatPhysChemWUT project which is partially funded by the European Union through the European Social Fund.
Big and Little Bang

Similar to the QGP in the early universe

our Universe

a heavy-ion collision
ALICE & Heavy-ion collisions

- ALICE – the heavy-ion dedicated experiment at LHC
  - study matter at extreme conditions using multiple observables

- Main technical aspects:
  - challenging tracking (high multiplicities, low momenta)
  - particle identification (PID) using practically all known techniques
  - TPC – heart of ALICE tracking and dE/dx
ALICE MasterClass – measurements

- Three measurements signatures of QGP
  - 1) Strangeness enhancement → decays of strange hadrons
  - 2) Jet quenching → nuclear modification factor ($R_{AA}$)
  - 3) J/$\Psi$ suppression (work in progress)
ALICE MasterClass

- Based on ROOT (EVE):
  - simplified event display, close to the one used in the control room
  - visual analysis of small sample of events (~50)
  - statistical analysis of larger samples (fitting, background parameterization)
  - “writing code”
New developments

Initial work by Christian Christensen (Copenhagen) and later by CERN Summer Student (Jonas Toth) in 2018
Taken over by Piotr Nowakowski (WUT) afterwards

- **Macros → standalone app**
- **Common framework**
  - all exercises share core classes
- **Source code on CERN GitLab:**
  https://gitlab.cern.ch/pinowako/masterclass-continued
- **CMake build system**
- **Available versions:**
  - **Linux** (AppImage binary, clickable, **ROOT embedded**)!
  - **Windows** (Visual Studio compiled, installer, clickable, **ROOT embedded**) – first time provided!
  - **Virtual Box** machine (pre-configured Ubuntu)
Webpage

OLD page

NEW page (Drupal)...
work in progress...
https://alice-masterclass.web.cern.ch/

Plan to use the new Drupal template from the new IMC page, when ready.
How does it look like?

Looking for strange particles
visual analysis

J/Ψ suppression
electron PID
How does it look like?

Looking for strange particles
invariant mass fits

Nuclear modification factor ($R_{AA}$)
selecting primary tracks
Limitations & further plans

- **Limitations of ROOT 6:**
  - EVE and GUI in ROOT to become deprecated in ROOT 7
  - no support for modern high-res. Screens (i.e. Retina)

- **Solution → towards a fully web based application**

- **Our (own) requirements:**
  - keep the app as close to the current one as possible
  - read directly ROOT data files and ROOT geometry (no data/geometry conversion)
  - most of calculations done on the client side/in the browser (avoid server overloads)

- **Technology choice (28 Nov. meeting ROOT Team):**
  - do not use ROOT on the server side → will quickly overload
  - use JSROOT to display geometry and histograms
  - use OpenUI5 for GUI (OUI5 to be used in ROOT 7)
  - use JavaScript instead of ROOT for simple fits and “code writing”
Web version – proof of concept

- JSROOT visualization of ALICE as implemented by ROOT Team
Instead of a Summary

LIVE DEMO

Comments, suggestions, bug reports, etc.:
alice-masterclass-dev@cern.ch
Installation – step 1 ➔ Visual Studio
Installation – step 2  ➔ VS C++ IDE

Installing — Visual Studio Community 2019

**Workloads**

- ASP.NET and web development
  - Build web applications using ASP.NET, ASP.NET Core, HTML/JavaScript, and Containers including Docker support.

- Python development
  - Editing, debugging, interactive development and source control for Python.

- Node.js development
  - Build scalable network applications using Node.js, an asynchronous event-driven JavaScript runtime.

- Desktop development with C++
  - Build Windows desktop applications using the Microsoft C++ toolset, ATL, or MFC.

**Language packs**

- Web & Cloud (4)
  - ASP.NET and web development
  - Python development
  - Node.js development
  - Desktop development with C++

**Installation locations**

- Location
  - C:\Program Files (x86)\Microsoft Visual Studio\2019\Community

**Installation details**

- Visual Studio core editor
- .NET Core cross-platform development
- ASP.NET and web development
- Windows (3)
  - .NET desktop development
  - Universal Windows Platform development

- Optional
  - .NET Framework 4 – 6 development tools
  - Cloud tools for web development
  - .NET profiling tools
  - Entity Framework 6 tools
  - Advanced ASP.NET features
  - Developer Analytics tools
  - Web Deploy
  - Live Share - Preview
  - Windows Communication Foundation
  - .NET Core 2.2 development tools
  - .NET Framework 4.6.1 development tools
  - .NET Framework 4.6.2 development tools
  - .NET Framework 4.7 development tools
  - .NET Framework 4.7.1 development tools

**System drive (C)**
- 3.32 GB
- Other drives: 971 MB
- Total space required: 4.27 GB

*By continuing, you agree to the license for the Visual Studio edition you selected. We also offer the ability to download other software with Visual Studio. This software is licensed separately, as set out in the 3rd Party Notices or in its accompanying license. By continuing, you also agree to those licenses.*
Installation – step 3 → MasterClass
Installation – step 4 ➔ MasterClass

Welcome to the ALICE MasterClass Setup Wizard

The Setup Wizard will install ALICE MasterClass on your computer. Click Next to continue or Cancel to exit the Setup Wizard.
Launch MasterClass