

# LHCb Ntupling Service Walkthrough

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Christine Aidala<sup>1</sup>, **Dillon Fitzgerald**<sup>1</sup>, Kai Habermann<sup>2</sup>, Ludwig Kramer<sup>2</sup>, Adam Morris<sup>3</sup>, Sebastian Neubert<sup>2</sup>, Piet Nogga<sup>2</sup>, Eduardo Rodrigues<sup>3</sup>, Marco Donadoni<sup>3</sup>, Daan Rosendal<sup>3,4</sup>, Tibor Simko<sup>3</sup>



<sup>1</sup>University of Michigan, <sup>2</sup>University of Bonn

<sup>3</sup>CERN, <sup>4</sup>Windsheim University



# Access to beta release

**The link to the beta release was emailed to registered users!**

You will first see this landing page...

Sign in with a CERN account

Username

Password

[Sign In](#)

[Forgot Password?](#)

Or use another login method

[Two-factor authentication](#)

[Kerberos](#)

By logging in, you agree to comply with the [CERN Computing Rules](#), in particular OCS. CERN implements the measures necessary to ensure compliance.

Sign in with your email or organisation

[Home organisation - eduGAIN](#)

[External email - Guest access](#)

Sign in with a social account

By clicking on the buttons below, you consent to CERN's transfer of your login request to the social provider and to receive your account name, name and e-mail for authenticating you. See more details in our [Privacy Notice](#).

[G Google](#) [in LinkedIn](#)

[GitHub](#) [f Facebook](#)

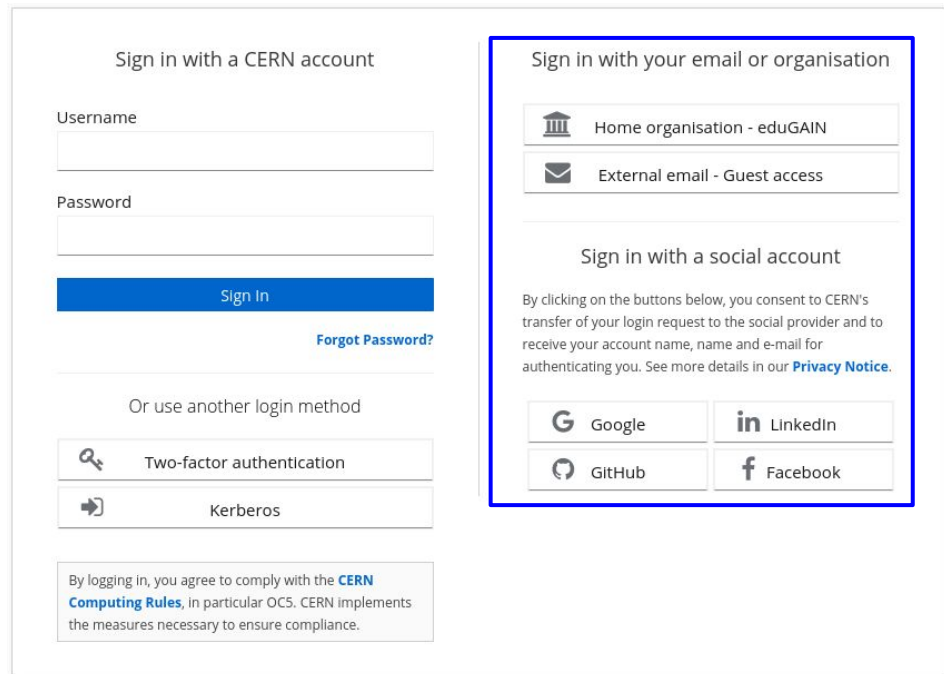
# Access to beta release

**The link to the beta release was emailed to registered users!**

You will first see this landing page...

Login with external emails and social accounts are permitted!

- If possible, please register and login using the same email address used to register for the Implications Workshop and this event. Otherwise, please let us know so we can take note of your preferred email address.



The screenshot shows a login interface with the following sections:

- Sign in with a CERN account:** Includes fields for Username and Password, a blue Sign In button, and a [Forgot Password?](#) link.
- Or use another login method:** Includes buttons for Two-factor authentication and Kerberos.
- Sign in with your email or organisation:** (Highlighted with a blue border) Includes buttons for Home organisation - eduGAIN and External email - Guest access.
- Sign in with a social account:** Includes buttons for Google, LinkedIn, GitHub, and Facebook. Below these buttons is a disclaimer: "By clicking on the buttons below, you consent to CERN's transfer of your login request to the social provider and to receive your account name, name and e-mail for authenticating you. See more details in our [Privacy Notice](#)."
- Footer:** A small box stating: "By logging in, you agree to comply with the [CERN Computing Rules](#), in particular OCS. CERN implements the measures necessary to ensure compliance."

# Register External Email Address

Using the same email you registered for the event with will allow us to verify your identity when reviewing your requests

First name

Last name

Email

Password

Confirm password


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**Password Policies**

Your password must meet the following criteria:

- At least 12 characters long
- Contain at least one lowercase letter
- Contain at least one uppercase letter
- Contain at least one digit
- Passwords must match

Captcha:  
The code is valid only for 60 seconds. Your answer will be considered incorrect if you don't answer within 60 seconds. You can always reset the timer by generating a new code with the "Reload" button below.



Code:

[« Back to Login](#)

# Creating your Profile

Once the authentication step is complete, you will be prompted to create a profile on the LHCb Ntupling Service

This information is useful to us for:

- Improving the LHCb Ntupling Service based on the needs of the active user base
- Collecting statistics to communicate with funding agencies

## Edit profile

Name \*

Field of research \*

Position \*

If you are a member of an experiment, please select it here

Optional remarks

# Now you are ready!

## LHCb Open Data Ntupling Service

Logged in as dillon.fitzgerald@cern.ch [Edit profile](#)

Your requests

Create new request

Welcome to the LHCb Open Data Ntupling Service! This application enables you to ask the LHCb collaboration for custom LHCb open data production for your education or research. Please see the [documentation](#) and the [paper](#).

# Live Demo and Interactive Walkthrough

I will show you how to make a request to produce Ntuples for the following decay

$$B_s^0 \rightarrow (J/\psi(1S) \rightarrow \mu^+\mu^-)(\phi(1020) \rightarrow K^+K^-)$$

This channel has been used at LHCb to quantify CP violation!

- [Phys. Rev. Lett. 132, 051802 \(2024\)](#)
- [Phys. Rev. Lett. 114, 041801 \(2015\)](#)
- [Eur. Phys. J. C 79, 706 \(2019\); erratum 80, 601 \(2020\)](#)

# Physics Motivation

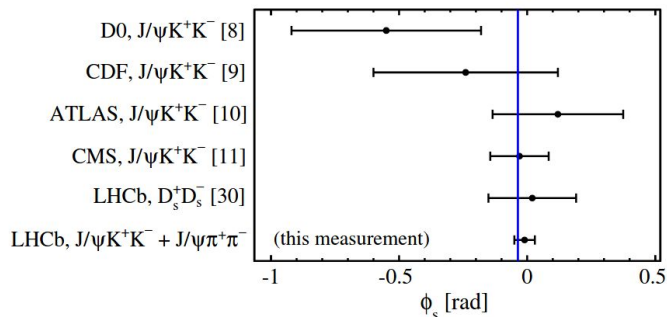
- $B_s^0$  oscillates between different eigenstates
- The final state is a mix of CP-even and CP-odd eigenstates depending on the relative orbital angular momentum of the  $J/\psi(1S)$  and  $\phi(1020)$  mesons
- The CP violating phase  $\phi_s$  arises from interference of decay amplitudes from decays occurring before and after  $B_s^0$  oscillation between eigenstates
  - It can be extracted by disentangling the mixture of CP-even and CP-odd states of the decay products

**Reference:** [Phys. Rev. Lett. 114, 041801 \(2015\)](#), [Phys. Rev. Lett. 132, 051802 \(2024\)](#)



# CP Violation at LHCb

So important to LHCb's core science mission that it is in our logo!



[Phys. Rev. Lett. 114, 041801 \(2015\)](#)



[Nat. Phys. 18, 1-5 \(2022\)](#)

—  $B_s^0 \rightarrow D_s^- \pi^+$  —  $\bar{B}_s^0 \rightarrow B_s^0 \rightarrow D_s^- \pi^+$  — Untagged

