

# Simulation Campaigns for the Early Science Program Development

The context of this presentation is simulation campaigns supporting the development of the Early Science Program for the EIC. It does not address other priorities for simulation campaigns in the coming months.

- BNL and Jefferson Lab requested, by May 1, *“a short document summarizing the science that would be possible from those early data.”*
- In this discussion, we assume that the report deadline will not change.
- We therefore consider three simulation campaigns:

<b>25.12</b>	<ul style="list-style-type: none"><li>• Available.</li></ul>
<b>26.02</b>	<ul style="list-style-type: none"><li>• Started.</li></ul>
<b>26.03</b>	<ul style="list-style-type: none"><li>• In preparation.</li></ul>

# Simulation Campaign: **Status and Plans**

<b>25.12</b>	<ul style="list-style-type: none"><li>• The December campaign covers all requests by the PWGs, including priority levels 2, and 3.</li><li>• It contains selected productions with background at the 10GeV×100GeV beam energy setting (<b>see also backup slide</b>).</li></ul>
<b>26.02</b>	<ul style="list-style-type: none"><li>• The <b><u>26.02 release</u></b> was announced in last week's ePIC Software &amp; Computing meeting.</li><li>• PACs and PWGs updated priorities; requests with priority -1 will be removed. <b>Thank you!</b></li><li>• <b>The February campaign has started.</b></li><li>• It will include all requests, including priority levels 2 and 3 and background as requested.</li></ul>
<b>26.03</b>	<ul style="list-style-type: none"><li>• The March campaign provides an opportunity to include new features and MC input files.</li><li>• Feedback from the PACs and PWG indicates that there is no urgent need for new features,</li><li>• but there may be a need for additional MC input. This will require coordination.</li></ul>

# New Simulation Production Requests

- We provide an [overview of requested simulation productions from DSCs and PWGs](#).
- If you would like to request a simulation production that is not included in this overview, please follow these steps:
  1. Coordinate with your PWG and the PACs. The PACs will update the overview and assign a priority to your request.
  2. Generate the MC input following our [guidelines](#).
  3. Once the input file is available, submit your request via [our form](#).

## Deadlines

- The deadline for new simulation production requests for 26.02 has passed.
- **The deadline for new simulation production requests for 26.03 is Monday, February 16.**
  - This allows sufficient time to test the input files using a small production.
  - Please note that the PWG is responsible for ensuring that MC input files meet the guidelines. Files that do not meet these guidelines will not be accepted.

# Coordination Requests

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**Request:** Please communicate any production-specific requests to Holly, Sakib, and Thomas, and ensure that all three are contacted.

**Request to PWGs:** Please critically review your requests:

- Is background needed for the study?
- What is the minimal amount of statistics required for the study?

Please revise your requests accordingly. For larger requests, a justification is required. See [our form](#) for details.

# Simulation Requests

## Simulation Status and Priorities

- During the ePIC and EIC Physics Readiness Workshop, March 17 to 19, a session will be dedicated to the physics performance of the ePIC detector, including background studies.
- The goal of this discussion is to identify areas where reconstruction development is needed and to prepare for the next revision of the preTDR and the papers for the NIMA special issue.
- Preparation for this session will take place at the **PAC meeting on Tuesday, March 3**, where the PWGs will be asked to provide status updates on the impact of background based on existing studies for the preTDR and the Early Science Report. The PAC meeting will be joint with Software & Computing.

## Simulation Readiness:

- The 25.12 campaign includes simulation productions with background.
- Good tracking efficiency and purity for 18GeVx275GeV beam energy setting
  - when cutting on vertex position and requiring at least 4 tracking hits.

## Link to Detector Studies

- The session will also cover priority detector studies.
- One example is the SVT, where a recent review recommended that we “*establish in simulation the tolerable level of dead channels for sensor acceptance.*” This requires dedicated simulation work, as well as a discussion of which physics studies are needed in addition to tracking efficiency and purity studies.

# Backup

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# Status of **Mixed Background** Simulation and Reconstruction

- The 10 GeV synchrotron background HepMC3 input files were provided in late October.
- An initial issue with memory consumption during reconstruction was identified and resolved in early November, reducing memory usage to a reasonable level ([EICrecon issue #2174](#)).
- The November campaign was skipped.
- During the December campaign, we produced limited samples of 10×100 and 10×275 NC DIS for  $Q^2 > 1$ , with one signal per 2 $\mu$ s timewindow.
- A second issue related to the large number of intermediate track states was resolved in January ([EICrecon issue #2245](#)).
- We will begin running mixed background samples at larger scale starting in February.