

**Subject:** Re: Ping Physics Working Groups again?

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**Date:** 7/11/22, 16:01

**To:** eic-projdet-conveners-l@lists.bnl.gov, eic-projdet-sc-l@lists.bnl.gov

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Dear Physics Working Group Convener,

We would like to remind you (and provide a bit more information) on the urgent need to investigate the requirements for low-momentum PID coverage.

As you know, the Yellow Report specifies the needed  $K/\pi$ ,  $\pi/p$  separation but does not discuss in detail the lower edge of the momentum range.

We would like you to focus on the barrel and the forward region. In terms of the barrel, we would like you to look at the slides from Joe from the July 7 GD/I meeting:

<https://indico.bnl.gov/event/16314/contributions/65336/attachments/42008/70364/20220707-hpDIRC-threshold-mode-schwiening.pdf>

This shows that the DIRC potentially can provide PID through threshold/veto down to  $\sim 250$  MeV/c. This is now being further studied by the hpDIRC group. The question now is: \*do we need to have PID below 250 MeV/c in the barrel?\* How strong a physics case is there and what would we lose if we do not cover the region?

The situation is a bit different in the fwd region. Here it is mainly the dRICH aerogel threshold that sets the limit at low- $p$ .

$3 < p < 60$  ( $K/\pi$ )

$0.85 < p < 15$  ( $e/\pi$ )

In threshold mode the  $K/\pi$  lower limit can probably be pushed down to  $\sim 1$  GeV according to studies.

So again: \*what would we lose if we do not have PID below 1~ GeV in the fwd region?\*

Some of these studies will not need full simulations. Much can be done already on the generator level with simple cuts on PID. We kindly ask you to focus on this issue in the next few weeks. A better understanding of the low- $p$  PID requirements is of enormous relevance for the detector design.

We also would like to emphasize that key physics measurements (featured in WP/NAS) have priority here as we have to ensure their feasibility. We understand that there is always a corner of physics that people find interesting and that stretches the requirements but we need to focus on our main topics.

We plan to have a GD/I meeting on your findings sometimes in August. We hope that provides sufficient time to conduct the necessary studies.

Best regards  
GD/I conveners