Subject: Re: [EXTERNAL] RE: NPP follow-up
From: Elton Smith <elton@jlab.org>
Date: 5/22/20, 5:24 PM
To: Barry Ritchie <Barry.Ritchie@asu.edu>, "Shepherd, Matthew" <mashephe@indiana.edu>, Rory Miskimen <miskimen@physics.umass.edu>
CC: elton@jlab.org, Reinhard Schumacher <schumacher@cmu.edu>, Joerg Reinhold <reinhold@fiu.edu>, Beni Zihlmann <zihlmann@jlab.org>, "Mark M. Ito" <marki@jlab.org>, Ilya Larin <ilarin@jlab.org>

Hi Barry and Joerg,

Thank you very much for your valuable feedback and suggestions on the NPP draft. We will work with Matt and Reinhard to invite feedback from the collaboration. In parallel we will be glad for you to provide us with stylistic and suggestions for clarifications of the text.

Sincerely, Elton.

Elton Smith
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On 5/22/20 5:07 PM, Barry Ritchie wrote:

> Dear Colleagues,
>
> Based on our review of the responses to our initial report on the NPP proposal, we now recommend endorsement of the proposal as a GlueX Collaboration proposal. The revised proposal and the presentation to the collaboration satisfactorily addressed the concerns we had raised regarding backgrounds, target selection, and trigger.
>
> Sincerely yours,
>
> Barry Ritchie Joerg Reinhold
>
> Ad hoc Review Committee for NPP Proposal

Subject: Updated draft of NPP proposal on docDB
From: Elton Smith <elton@jlab.org>
Date: 5/9/20, 12:05 PM
To: Barry Ritchie <barry.ritchie@asu.edu>, Joerg Reinhold <reinhold@fiu.edu>
CC: elton@jlab.org, Reinhard Schumacher <schumacher@cmu.edu>, Matt Shepherd <mashephe@indiana.edu>, Eugene Chudakov <gen@jlab.org>, Rory Miskimen <miskimen@physics.umass.edu>, Beni Zihlmann <zihlmann@jlab.org>, "Mark M. Ito" <marki@jlab.org>, Ilya Larin <ilarin@jlab.org>

Hi Barry and Joerg,

We have updated our NPP proposal draft based on your feedback. The new draft is available on docDB as GlueX-doc-4373 v2, https://halldweb.jlab.org/doc-private/DocDB/ShowDocument?docid=4373.

Backgrounds
Section 5 Backgrounds has been substantially updated
- Section 5.2 describes the incoherent background
- Section 5.3 describes mis-identified backgrounds (broken eta's)
- Section 5.4 describes the method of extracting the Primakoff signal in presence of nuclear coherent, nuclear incoherent and broken eta's.
- Section 7 (Errors and Sensitivity) has been updated to reflect changes to Section 5. Our new estimate for the quadrature sum of statistical and systematic uncertainties on the cross section is 5.3%, down slightly from our previous estimate of 6.3%.
- Appendix D describes the expected scaling behavior of cross sections from single-pion production to double-pion production.

Compatibility with CPP
- Target: At the time of the CPP proposal, a final decision had not been taken regarding the material for the target. However, CPP now plans to use a 208Pb target, which is assumed for NPP .
- Trigger: We have updated Section 4.3 to describe our expectation for an all-neutral trigger, which extrapolated from measurements predicts a rate of about 10KHz. This should allow running concurrently with CPP.

We thank you for your original comments and welcome additional feedback.

Sincerely, Elton, Rory, Ilya, Mark, and Beni.

--
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Feedback from Barry Ritchie/ Tue Apr 14

(Redirected from Feedback from Barry / Tue Apr 14)

Barry setup a zoom meeting this noon to give me some feedback on the NPP proposal. He has read the proposal and said that it is generally in good shape, but has comments on the section on backgrounds. He had the following comments:

1. Introductory points on backgrounds are clear and lay a good foundation
2. Coherent backgrounds. This is section is nicely worked out.
   - Suggests that Section 5.2 -> Subsection 5.1.1
   - Add a final subsection summarizing on each background with a conclusion/summary
3. Incoherent backgrounds.
   - Need quantitative estimates
4. Other backgrounds
   - Need to simulate eta->3pi and Npipi backgrounds
5. Suggests that we add a final section simulating all backgrounds together to demonstrate effective extraction of the signal

A final comment was a question we should include any discussion on a lead-tungsten calorimeter (immediately before 5.4.2).

- He will be glad to give us comments on the background section when it has been updated.
- Also at that time he will provide suggestions for wording and clarifications in the text

Subject: Fwd: Re: [EXTERNAL] Comments from Joerg Reinhold to NPP proposal
From: Elton Smith <elton@jlab.org>
Date: 6/17/20, 4:35 PM
CC: elton@jlab.org

-------- Forwarded Message --------
Subject: Re: [EXTERNAL] NPP proposal
Date: Wed, 15 Apr 2020 17:16:19 +0000
From: Joerg Reinhold <reinhold@fiu.edu>
To: Elton Smith <elton@jlab.org>, Reinhard Schumacher <schumacher@cmu.edu>
CC: Barry Ritchie <Barry.Ritchie@asu.edu>

OK, here we go:

The first question that comes to my mind is a matter of definition: Is this a new experiment proposal or more a proposal to analyze data that is being taken anyhow?

So, I looked first at whether the approved CPP and this proposal are compatible. My conclusion is that there are two issues that need to get clarified in order to really run NPP at the same time as CPP: the target choice, Sn vs Pb, and the TOF trigger.

Details:

My understanding is that the experimental configuration is the same up to the FCAL. The CPP muon detectors, go all behind the FCAL.

The CPP experiment will remove the start counter. NPP shows the same configuration.

The one big difference I do find is the target: CPP lists a 116Sn target, while NPP lists a Pb target. Did CPP change the target after the experiment has been approved? Interestingly, the CPP experiment presents MC studies with a Pb target.

The remaining question is the trigger:

CPP

/For this experiment, the total hadronic rate for a 107γ/s of collimated flux between 5.5 and 6 GeV incident on a *5 % radiation length Sn target* is less than 3.5 kHz, well below the DAQ limit of 20 kHz. The trigger condition will also be open and the selection of the two pion signal will be accomplished during offline reconstruction. The FCAL will be used for triggering on the pion pair, but in order to be efficient for
/
/

/
/our two-pion trigger, *the thresholds in the FCAL will need to be reduced below 100 MeV*. Figure 23 shows the distribution of hadronic events surviving a single 30 MeV threshold cut in the FCAL, which eliminates the events produced by photons with energies of less than about 3 GeV, well below the coherent peak. However, most of the trigger rate for low thresholds in the FCAL is due to the electromagnetic backgrounds, which contribute 10 kHz at a threshold of 100 MeV. *In order to reduce the threshold in the FCAL even further, we will need to select coincident hits in the time-of-flight scintillators and veto on energy in the BCAL.*/

NPP (comparatively short description)

/The Primakoff reaction will transfer all the energy of the beam into four photons, which are going forward. All this energy will be deposited in the FCAL, except for leakage down the beampipe.
/
/
/
/We expect a simple trigger with an energy threshold in the FCAL should have very high efficiency for any events that can be reconstructed./

I would assume that any FCAL threshold with good charges pion efficiency also would be efficient for 4 photons. However, the proposed coincident TOF trigger for CPP would be incompatible with NPP.

Joerg

Dr. Joerg Reinhold, Professor
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