

Discussion points

12/23/2021

- Happy holidays everyone !
- Next meeting January 6 at 12:30 pm Eastern time. Do we want to change the time, day, frequency of this meeting ?
 - Some milestones for next year
 - Snowmass write-ups due in January
 - Snowmass events all through spring and summer.
 - Document such as a pre-conceptual design report or a physics design report for FPF in October 2022
- HL-LHC schedule start now semi-officially in 2028 - talk at the CERN meeting at the end of Jan.
 - What does this mean for the strategy for FPF ? saty tuned.
 - wise to delay until a new robust collaboration emerges ?
 - who engages effort towards encouraging new leadership ?
 - How do we navigate all the funding agencies and the US CD0, CD1, ... etc. Is it necessary ?
- Technical issues
 - What options to keep open and how many ? How to integrate all the systems in FPF ?
 - High density and high resolution are opposing requirements for the detector. We should leave room open for ideas.
- Funding ? How do we coordinate at least within the US. The worst thing is for an agency to see multiple proposals to do the same thing. They will reject all of them.

New work just posted.

<https://arxiv.org/abs/2112.11605>

Parton distribution function uncertainties in theoretical predictions for far-forward tau neutrinos at the Large Hadron Collider

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New experiments to measure neutrinos in the far-forward region at the Large Hadron Collider (LHC) are under design or already in preparation. Two of them, Faser- ν and SND@LHC, are expected to be active during Run 3 and have the potential to detect neutrinos that come from high-energy collisions in one of the LHC interaction points, extracted along the direction tangent to the beam line. Tau neutrinos and antineutrinos come predominantly from D_s^\pm production in pp collisions, followed by the leptonic decay of these mesons. Neutrino pseudorapidities in the range of $\eta > 6.9$ and $\eta > 8.9$ are relevant to these future experiments. At such large pseudorapidities at high energies, theoretical predictions rely on parton distribution functions (PDFs) in a combination of very small and large parton- x values. We evaluate PDF uncertainties in a next-to-leading order (NLO) QCD calculation of the flux of tau neutrinos plus antineutrinos produced by D_s^\pm decay in the far forward region at the LHC. The theoretical uncertainty associated with the 40 PDF sets of the PROSA19 group amount to $\pm(20 - 30)\%$ for the tau neutrino plus antineutrino number of charged-current events. Scale uncertainties are much larger, resulting into a range of charged-current event predictions from $\sim 70\%$ lower to $\sim 90\%$ higher than the central prediction. A comparison of the predictions with those obtained using as input the central PDFs from the 3-flavour NLO PDF sets of the CT14, ABMP16 and NNPDF3.1 collaborations show that far-forward neutrino energy distributions vary by as much as a factor of $\sim 2 - 4$ relative to the PROSA19 predictions at TeV neutrino energies. The Forward Physics Facility in the high luminosity LHC era will provide data capable of constraining NLO QCD evaluations with these PDF sets.

Workshop planning

- *Initial discussion regarding workshop at CFNS Stony Brook jointly with BNL*

Forward physics at EIC and LHC are joint at the hip and also with the upper atmospheric QCD showers. A couple of meetings on this supported by CFNS — one in Japan and one at CFNS in the past two years. LHCf and RHICf collaborations were involved. If complementarity with other measurements is strong, the case may influence the P5 process.

CFNS workshops run by solicitations. An open call for September 2022-August 2023 workshop schedule will go out some time in March/April 2022. Need to apply and make a good organizing committee of about ~4-5. The solicitations go to an external review committee and by June/July they respond with recommendations to director who implements them.

Needed scope of the meeting, science and estimated costs. It is OK to augment external monies with what the center will provide.

A 2-4 day workshop with 40-50 people can be accommodated in the Simon's center or Wang center.

Will need to work on how to fund some younger or retired people. Most will be expected to travel on their own funding.