Abstract ID : **67**

Probing free nucleons with (anti)neutrinos

Content

We discuss a method to study free protons and neutrons using $\nu(\bar{\nu})$-hydrogen (H) Charged Current (CC) inelastic interactions using ν and $\bar{\nu}$ CC interactions on both H and nuclear targets. Probing free nucleons with (anti)neutrinos provides information about their internal structure, as well as a crucial input for the modeling of $\nu(\bar{\nu})$-nucleus (A) interactions. Such measurements can also represent a tool to address some of the limitations of accelerator-based neutrino scattering experiments on nuclear targets, originating from the combined effect of the unknown (anti)neutrino energy and of the nuclear smearing. We also discuss a method to impose constraints on nuclear effects and calibrate the (anti)neutrino energy scale in $\nu(\bar{\nu})$-A interactions, which are two outstanding systematic uncertainties affecting present and future long-baseline neutrino experiments. The method uses $\nu(\bar{\nu})$-H interactions as control samples and is based on the approach we recently proposed integrating both nuclear and "solid" hydrogen targets within a detector designed to provide an accurate control of the configuration,chemical composition and mass of the targets.

Submitted on behalf of a Collaboration?

No

Primary author: PETTI, Roberto (University of South Carolina (US))

Presenter: PETTI, Roberto (University of South Carolina (US))

Track Classification: WG1: Structure Functions and Parton Densities

Contribution Type: Parallel talk

Submitted by **PETTI, Roberto** on **Thursday, 3 February 2022**

Abstract ID : **331**

Studying nuclear matter with jets in the sPHENIX experiment at RHIC

Content

The sPHENIX detector currently under construction at Brookhaven National Laboratory's Relativistic Heavy Ion Collider (RHIC) is designed to significantly advance studies of the microscopic nature of nuclear matter. The experiment incorporates full azimuth vertexing, tracking, and a complete set of electromagnetic and hadronic calorimeters over the pseudorapidity range $|\eta| < 1.1$. This powerful detector system is coupled with a high rate DAQ in order to deliver unprecedented data sets enabling a wide range of jet measurements at RHIC. SPHENIX has an extensive a multi-year physics program planned which includes Au+Au, polarized p+p and p+Au collisions. Measurements of jets and jet substructure in these systems will provide unprecedented access to nuclear PDFs and the spin-orbit correlations in the proton through measurements of the Sivers and Collins asymmetries. In this talk we will present an overview of the sPHENIX jet measuring capabilities and the planned sPHENIX jet physics program.

Submitted on behalf of a Collaboration?

Yes

Primary author: ROSATI, Marzia (Iowa State University (US))

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Track Classification: WG1: Structure Functions and Parton Densities

Contribution Type: Parallel talk

Comments:

I am submitting this abstract as chair of the sPHENIX Speakers Bureau, the speaker will be selected by the collaboration upon the abstract acceptance

Submitted by **ROSATI, Marzia** on **Friday, 18 February 2022**