

# AI/ML for Semi-Inclusive and Exclusive DIS Measurements

Friday, 17 February 2023 12:00 (15 minutes)

Deep Inelastic Scattering (DIS) is described by an exchange of virtual photons or, at high energies, the  $Z^0$ . The distinctive characteristic of DIS in contrast to many processes (such as  $pp$  at the LHC or  $pA$  at the RHIC) is that the kinematics are precisely computable from the leptonic (and hadronic) final state at all orders. DIS reconstruction has a strong dependence on the collision reconstruction quality and the underlying detector resolutions. The classical methods are an option for reconstruction with certain limitations, such as higher order QED radiation effects. Our approach is a neural network method for reconstruction which introduces smaller systematic errors in deep-inelastic scattering, since it has the advantage of weighting classical reconstructions and effectively utilizing information all over the available phasespace. This has been previously studied for the ZEUS experiment and applied to inclusive measurements with impressive results. The study involves using EIC simulations and collider data from ZEUS to apply the new method on the EPIC detector and extend it to exclusive measurements, which will be a novel approach.

## Supervisor

Zisis Papandreou

## Funding Agency

NSERC

## Supervisor Email

zisis@uregina.ca

## Your Email

soy062@uregina.ca

**Primary author:** ORESIC, Stjepan (University of Regina)

**Presenter:** ORESIC, Stjepan (University of Regina)

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