Contribution ID: **3739** Type: **Oral Competition (Graduate Student) / Compétition orale (Étudiant(e) du 2e ou 3e cycle)**

(G*) Reconstruction of Semi-Leptonic Top Anti-top Pair Production with Deep Learning at ATLAS

Monday 19 June 2023 14:45 (15 minutes)

As the heaviest known fundamental particle, the top quark plays a special role in many theories of new physics beyond the Standard Model. Reconstruction of top anti-top pair production to the best possible resolution is therefore crucial to enhancing our sensitivity to Beyond Standard Model effects in precision measurements and searches at the Large Hadron Collider (LHC), from improved mass resolutions for bump hunting to more diagonal unfolding matrices for differential cross-section measurements. As such, we've designed a deep neural network (TRecNet) that infers the four-vectors of the top and anti-top quarks from detector-level decay products in the semi-leptonic decay channel at ATLAS. The performance of TRecNet and several slight variations of the network are compared to traditional top reconstruction algorithms based on likelihood fits and are shown to improve upon both reconstruction efficiency and resolution.

Keyword-1

Top Antitop Pair Production

Keyword-2

Deep Neural Network

Keyword-3

ATLAS

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Session Classification: (PPD) M2-1 Collider 1 | Collisionneur 1 (PPD)

Track Classification: Technical Sessions / Sessions techniques: Particle Physics / Physique des particules (PPD)