# NEC'2019

**XXVII International Symposium on Nuclear Electronics & Computing**

Montenegro, Budva, Becici, 30 September - 4 October 2019

Contribution ID: **127**                                                                 Type: **Sectional**

# DijetGAN: A Generative-Adversarial Network Approach for the Simulation of QCD Dijet Events at the LHC

*Thursday, 3 October 2019 10:00 (15 minutes)*

We present a Generative-Adversarial Network (GAN) based on convolutional neural networks that are used to simulate the production of pairs of jets at the LHC. The GAN is trained on events generated using MadGraph5 + Pythia8, and Delphes3 fast detector simulation. A number of kinematic distributions both at Monte Carlo truth level and after the detector simulation can be reproduced by the generator network with a very good level of agreement. Our GAN can generate 1 million events in less than a minute and can be used to increase the size of Monte Carlo samples used by LHC experiments that are currently limited by the high CPU time required to generate events.

**Primary authors:** Dr FAUCCI GIANNELLI, Michele (University of Edinburgh); Dr DI SIPIO, Riccardo (University of Toronto); Ms KETABCHI HAGHIGHAT, Sana (University of Toronto); Dr PALAZZO, Serena (University of Edinburgh)

**Presenter:** Dr FAUCCI GIANNELLI, Michele (University of Edinburgh)

**Session Classification:** Machine Learning Algorithms and Big Data Analytics

**Track Classification:** Machine Learning Algorithms and Big Data Analytics