PSD MIXER NOVEMBER 2023

: Friday, November 3, 2023

: 2:30pm

: via Zoom and in the Auditorium

: Pizza will be available in-person

: Kick back, relax, and have fun!

ZOOM

https://ubc.zoom.us/j/69346714318?pwd=TTNQcGhpeDc0T0g1b3NWTy9EMktCUT09&from=addon

Meeting ID: 693 4671 4318
Passcode: 907898

BY PHONE

Join by Telephone - For higher quality, dial a number based on your current location.

Dial Canada:
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PLEASE KEEP YOUR MICS MUTED

"WHAT'S THE GIST, PHYSICIST?"

Join us for another afternoon of division updates, science, community, and good food!

Tentative Agenda:

- Division updates w/ Petr (~15 min)
- Q+A w/ Petr (~5 min)
- "M9A – A New Muon Beamline at TRIUMF," presented by Syd Kreitzman (~15 min)
- "Calorimeter simulation surrogate using a Quantum-Assisted variational autoencoder," presented by Javier Toledo Marín Abstract on the following page!
- Pizza and pop!

REJOICE!

Physical Sciences now has a subscription mailing list! You can subscribe here to make sure you get all the email updates for the division!

“CALORIMETER SIMULATION SURROGATE USING A QUANTUM-ASSISTED VARIATIONAL AUTOENCODER” – JAVIER TOLEDO MARÍN

Numerical simulations of collision events within the ATLAS experiment have played a pivotal role in shaping the design of future experiments and analyzing ongoing ones. However, the quest for accuracy in describing Large Hadron Collider (LHC) collisions comes at an imposing computational cost, with projections estimating the need for millions of CPU-years annually during the High Luminosity LHC (HL-LHC) run. Simulating a single LHC event with Geant4 currently devours around 1000 CPU seconds, with calorimeter simulations imposing substantial computational demands. To address this challenge, we propose a Quantum-Assisted deep generative model. Our model marries a variational autoencoder (VAE) on the exterior with a Restricted Boltzmann Machine (RBM) in the latent space, delivering enhanced expressiveness compared to conventional VAEs. The RBM nodes and connections are meticulously engineered to enable the use of qubits and couplers on D-Wave's Pegasus Quantum Annealer to further hasten the calorimeter data generation. We also provide preliminary insights into the requisite infrastructure for large-scale deployment.