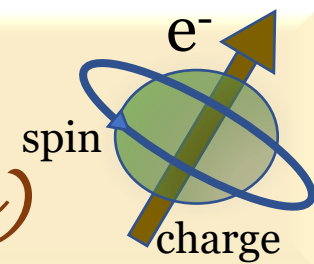# W2S Seminar
(Webinar series on Spintronics)

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Magnetic Josephson Junctions for artificial synapses

Speaker:

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Date and time: 18/11/2021 at 8.00 pm IST i.e. 3.30 pm CET

Abstract

The performance of artificial intelligence (AI) technologies has improved significantly over the last decade in such a way that AI is now everywhere in our daily life via software neural networks. However, this continual growth in computational performance of these networks comes with large increases in the computational time and energy needed to train them. Developing AI at the hardware level has the potential to bend this curve and provide fast and lower energy computing. In this talk, I will present a new hybrid magnetic-superconducting device that can be used as an artificial synapse in neuromorphic circuits. The device is a magnetic Josephson Junction that consists of a barrier of magnetic nanoclusters between two Nb electrodes. The critical current of these junctions can be tuned by varying the magnetic order of the clusters, which can be used to perform synaptic weighting. I will describe the properties of the MJJ and show that its synaptic properties can be obtained in different material systems with an energy cost as low as 10^{-19}J. Finally, I will present circuit simulations where MJJs are included in a neural network for image recognition operating at speeds over 100 GHz, and show some preliminary experimental validation of the simulations.

To attend the lecture please visit: **Passcode: 525698** Zoom link:
https://us06web.zoom.us/j/85814942429?pwd=czZGbWFhYU41MXl
LUzh4ZVZVUmt1Zz09

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