SEMINAR NOTICE

Department of Physics and Engineering Physics
University of Saskatchewan

SPEAKER: Heba Bsharat, PhD candidate
Department of Physics & Engineering Physics

TOPIC: ***Experimental Studies of the Improved Plasma Confinement on the STOR-M Tokamak***

DATE: September 21, 2021

TIME: 3:30-4:30 p.m.

Join Zoom Meeting:
https://usask-ca.zoom.us/j/96818469630?pwd=aGpiVUtjcEJmZzBqclZ2S042eGpiQT09

Join by Telephone:
Local Saskatoon Dial-in Number: (639) 638-7474
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Meeting ID: 968 1846 9630
Passcode: 07412447
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Tokamak is presently the most promising magnetic confinement device to realize fusion energy. In tokamak, strong magnetic field is used to confine high temperature (100 million degrees Celsius) and high density fuels in the plasma state. The STOR-M (Saskatchewan Torus-Modified) tokamak operated at the University of Saskatchewan is presently the only tokamak device in Canada.

Study of high-confinement operation mode (H-mode) of tokamak operation plays an important role to achieve ignition conditions and to improve economical efficiency for fusion reactors. The anomalous transport originated from small-scale micro-turbulences and Magnetohydrodynamics (MHD) instabilities in large-scale field and pressure structures are two main obstacles that affect the confinement and safe operation of fusion reactors. The anomalous transport diffusion coefficient increases with the scale length of turbulence eddies. Breaking down large eddies to smaller ones can be realized via an electrically biased electrode inserted into the plasma which can induce a sheared plasma flow velocity. This technique is called electrode biasing. An externally applied magnetic field with a spatial structure similar to the intrinsic MHD instability structure in the plasma can counter-act on the magnetic field in the plasma to suppress the MHD instabilities. This technique is termed as resonant magnetic perturbations (RMP). These two experiments have been carried out on STOR-M tokamak. The H-mode is typically characterized by a rapid increase in plasma density in conjunction with a sudden drop in line emissions from the hydrogen plasma. After application of the RMP fields, suppression in the MHD activities and improvement in both particle and energy confinement times have also been observed.