W2S Seminar
(Webinar series on Spintronics)

spin
charge

Resonant spin-filtering based spin torque devices

Speaker:
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Via
Google meet

Abstract

Using the spin-dependent Keldysh non-equilibrium Green's function formalism, we present novel multi barrier applications in spintronics based on the physics of resonant spin filtering. We demonstrate an ultra-enhancement in the tunnel magneto resistance (TMR), well in excess of 2000%, as a result of highly sensitive and tunable spin filtering physics. With myriad applications possible by utilizing such a tunable spin filtering scheme, we present device designs catered toward emerging logic, memory and sensing functionalities that include (i) ultra-high sensitivity magneto resistance H-field sensors (ii) Improved spin transfer torque switching resulting from the non-trivial spin current profiles, and (iii) high-power output microwave generators and oscillators based on resonant spin-transfer torque dynamics. We then extend our analysis on how electronic analogs of optical phenomena such as anti-reflection coatings and Fabry-Perot resonances may be used to engineer double barrier tunneling for spintronic applications.

If interested to attend then please visit https://www.niser.ac.in/w2s-seminar/index.php