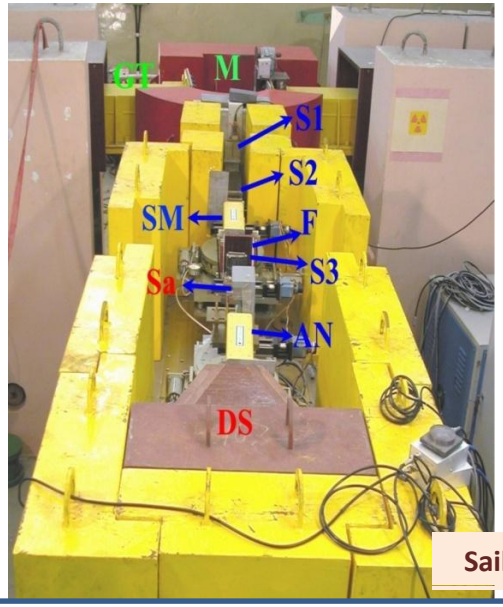
POLARIZED NEUTRON REFLECTOMETER



GT: Guide Tube;

M: Monochromator;

S: Slits;

SM : Supermirror;

F: Flipper;

Sa: Sample;

AN: analyzer;

DS: Detector Shielding

The polarized neutron reflectometer (PNR) has been designed for vertical sample geometry. It utilizes a highly collimated monochromatic: polarized or unpolarized beam of neutrons.

The reflectometer uses a linear position sensitive detector, which helps to collect the off-specular reflectivity data in addition to specular reflectivity data in a single setting.

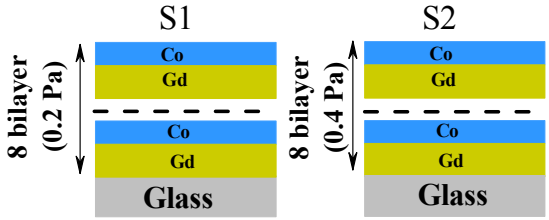
This facility has been widely used for structural and magnetic characterization of thin film samples, using specular and off-specular (diffuse) reflectivity techniques.

Saibal Basu and Surendra Singh, Journal of Neutron Research, 44, 109 (2006).

Instrument specification

Monochromator : Si(113)
wavelength : 2.5Å
ΔQ/Q : 0.141 - 0.411
Polarizer : FeCo/TiZr supermirror
Neutron flux : 10^4 n/cm^2/s
D.C. Flipper efficiency : 93%
Detector : linear He^3 filled PSD
Reflectivity : 1 - 10^{-4}

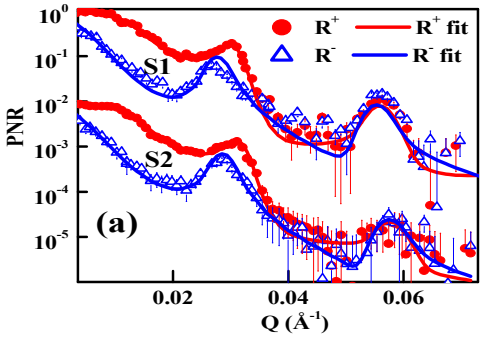
Interface induced magnetism of Gd/Co multilayers



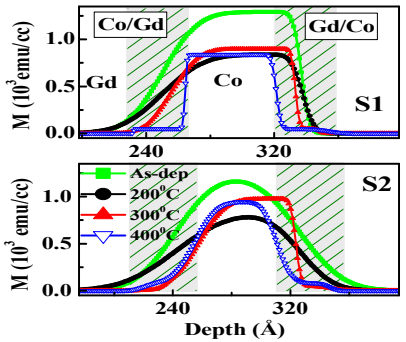
Sample Ar Pressure

S1 = 0.2 Pa

S2 = 0.4 Pa.



PNR data from multilayers



Depth profile of Magnetization

Recent Publications from PNR Instrument

1. Surendra Singh, C. L. Prajapat, D. Bhattacharya, S. K. Ghosh, M. R. Gonal and S. Basu, RSC Advances, 6, 34641 (2016).
2. N. Banu, Surendra Singh, B. Satpati, A. Roy, S. Basu, P. Chakraborty, Hema C. P. Movva, V. Lauter and B. N. Dev, Scientific Reports, 7, 41856 (2017).
3. N. Banu, Surendra Singh, Saibal Basu, Anupam Roy, Hema C. P. Movva, V. Lauter, B. Satpati, B. N. Dev, Nanotechnology 29, 195703 (2018).
4. Surendra Singh, M. Swain and S. Basu, Progress in Materials Science, 96, 1-50 (2018).
5. Surendra Singh, C. L. Prajapat, M. Gupta and S. Basu, Journal of Magnetism and Magnetic Materials 462, 58 (2018).
6. M. A. Basha, C. L. Prajapat, M. Gupta, Harsh Bhatt, Yogesh Kumar, S. K. Ghosh, V. Karki, S. Basu, and Surendra Singh, Physical Chemistry Chemical Physics, 20, 21580 (2018).
7. M. A. Basha, Harsh Bhatt, Yogesh Kumar, C. L. Prajapat, M. Gupta, V. Karki, S. K. Ghosh, S. Basu and Surendra Singh, Physical Chemistry Chemical Physics, 22, 16107 (2020).
8. M. A. Basha, Harsh Bhatt, Yogesh Kumar, C. L. Prajapat, M. Gupta, V. Karki, S. Basu and Surendra Singh, Journal of Alloys and Compounds, 815, 152640 (2020)