INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE

2A & 2B, Raja S. C. Mullick Road, Jadavpur, Kolkata-700 032

School of Physical Sciences

SEMINAR NOTICE

Title : **Tunable quantum states in square-net materials**

Speaker : **Dr. Ratnadwip Singha,** ***Department of Chemistry, Princeton University, Princeton, New Jersey 08544, USA***

Date : **August 30, 2022 (Tuesday)**

Time : **17:00 hours (IST)**

Venue : **Online Mode using Zoom Platform**
Zoom link of the seminar:
https://zoom.us/j/97021270635
Meeting ID: 970 2127 0635
Passcode: 259853

P.T.O.

Abstract:

Topological electronic systems are part of a large group called 'quantum materials'. Though numerous topological semimetals have been discovered in recent years, their band structures are rarely ideal. The linear band crossings are often obscured by trivial parabolic bands near the Fermi energy. Materials with a square-net motif in their crystal structure proved to be an exception as they host clean Dirac cones over wide energy range in the band structure [1-3]. The *Ln*SbTe (*Ln*=lanthanides) family of materials with an antimony square-net is one such example which also introduces magnetism into topological states [4-6]. We show that in this group of compounds a high degree of tunability can be achieved by changing the electron count in the square-net [7,8]. Furthermore, similar chemical reasoning can also be used to find new quantum materials with unique functionalities [9].

References

1. L. M. Schoop, *et al.* Nat. Comm. **7**, 11696 (2016).
2. R. Singha, *et al.* Proc. Natl. Acd. Sci. USA **114**, 2468 (2017).
3. S. Klemenz, *et al.* Annu. Rev. Mater. Res. **49**, 185 (2019).
4. L. M. Schoop, *et al.* Sci. Adv. **4**, eaar2317 (2018).
5. M. M. Hosen, *et al.* Sci. Rep. **8**, 13283 (2018).
6. S. Yue, *et al.* Phys. Rev. B **102**, 155109 (2020).
7. R. Singha, *et al.* Adv. Mater. **33**, 2103476 (2021).
8. R. Singha, *et al.* arxiv: 2208.05466 (under review) (2022).
9. R. Singha, *et al.* Adv. Func. Mater. **32**, 2108920 (2022).

All are cordially invited to attend the seminar