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Dr. Syed Salman Ahmad Warsi is an accomplished physicist, academician, and educator with extensive expertise in condensed matter physics. He currently serves as an Associate Professor in the Department of Physics at Integral University, Lucknow, and brings more than 25 years of experience in teaching, research, and academic mentorship.

Throughout his academic career, Dr. Warsi has taught undergraduate and postgraduate students, making significant contributions to physics education through his dedicated teaching and research guidance. He has successfully supervised numerous B.Sc. and M.Sc. dissertations and projects and is actively involved in mentoring doctoral scholars pursuing Ph.D. research in Physics.

His research interests include liquid-crystal systems, nanoscale materials, and contemporary topics in condensed matter physics. Dr. Warsi has published several peer-reviewed research papers in reputed journals and continues to contribute actively to scientific research and academic development.

In addition to his research contributions, Dr. Warsi has co-authored important educational books, including:

- *ICSE Physics for Class X (2025)*
 - *ISC Practical Physics for Classes XI & XII (2021)*
- He has also served as editor of the following scholarly books:*
- *Characterization of Liquid Crystals and Photonic Crystals (2022)*
 - *Advances in Contemporary Physics: High Energy, Cosmology and Soft Matter (2025)*

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CHAPTER - 8

A SYSTEMATIC APPROACH FOR ELECTRONIC AND THERMOELECTRIC PROPERTIES OF HALF-HEUSLER COMPOUNDS

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Half-Heusler compounds are an impressive class of materials with a huge potential for different applications such as future energy applications and for spintronics. The semiconducting Heusler compounds can be identified by the number of valence electrons. The band gap can be tuned between 0 and 4 eV by the electronegativity difference of the constituents. Magnetism can be introduced in these compounds by using rare-earth elements, manganese or ‘electron’ doping. Thus, there is a great interest in the fields of thermoelectric, solar cells and diluted magnetic semiconductors. The combination of different properties such as superconductivity and topological edge states leads to new multifunctional materials, which have the potential to revolutionize technological applications. Here, we review the structure, the origin of the band gap and the functionalities of semiconducting half-Heusler compounds.

INTRODUCTION:

The quest for novel functional materials has led to a resurgence of interest in half-Heusler compounds, a vast and versatile class of intermetallic materials that have garnered significant attention due to their tunable electronic and thermoelectric properties. The introduction of a book chapter on Half-Heusler (hH) compounds must bridge the gap between fundamental solid-state chemistry and urgent renewable energy needs. Highlighting these gaps and the material's specific importance provides the necessary "hook" for researchers and engineers.