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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 - 1

INTRODUCTION TO NUCLEAR EMULSION TECHNIQUE IN PARTICLE PHYSICS

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This chapter presents an introduction to the nuclear emulsion technique widely used in nuclear and particle physics for the detection and analysis of charged particles. We have discussed the historical background, composition and track formation in the emulsion. This technique gives very good visualization of the trajectories with a great spatial resolution.

INTRODUCTION:

High energy physics deals basically with the study of inner most structure of matter. In order to investigate these results, matter is studied within extremely small distances and this study requires the illumination of matter with radiation of the highest frequency and energy. For this purpose experiments in this field are carried out with the help of particle accelerators and the detection of secondary particles are made with different detectors.

The study of the characteristics of secondary charged particles produced in nucleus-nucleus reactions at relativistic energies has received considerable attention [1-4]. The reasons for investigating the production mechanism of secondary particles in heavy ion interactions might provide some valuable information about reaction mechanism in the nucleus-nucleus collisions. In relativistic heavy ion collisions, the secondary hadrons are formed instantaneously. There is a formation time between the collision and hadronization of the final state particles. They hadronize within the target nucleus and may re-interact with the surrounding target matter and produce cascade particles. Moreover, the studies on heavy ion interactions provide the means of distinguishing