

ডিব্ৰুগড় বিশ্ববিদ্যালয়ৰ ২০১৯-২০ শিক্ষাবৰ্ষৰ পৰা প্ৰবৰ্ত্তন হোৱা পছন্দভিত্তিক মূল্যায়ন ব্যৱস্থা (CBCS)ৰ  
তিনিবছৰীয়া স্নাতক মহলাৰ পাঠ্যক্ৰমৰ প্ৰথম বাৰ্ষিকৰ GEED101, পঞ্চম বাৰ্ষিকৰ DSEED501 আৰু  
GEEDN502 বাবে অনুমোদিত পাঠ্যক্ৰমৰ ভিত্তিত বচিত পাঠ্যপুথি

# স্নাতক মহলাৰ নিৰ্দেশনা আৰু পৰামৰ্শদান

## GUIDANCE and COUNSELLING



ড° দেইজী ৰাণী চুতীয়া  
বিতুৰাজ গোহাঁই

গীতাঞ্জলি ভৰালী  
অংকিতা বৰুৱা



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**SYLLABUS OF THE UG PROGRAMME IN EDUCATION  
DIBRUGARH UNIVERSITY  
B.A. IN EDUCATION (HONOURS)  
DSEED501 / GEED101: GUIDANCE AND COUNSELLING  
CREDIT: 6  
[MARKS: 100 (IN-SEMESTER: 20; END-SEMESTER: 80)]**

**Expected Learning Outcome:** On completion of the course, the students will be able to :

1. describe meaning, nature, purpose and scope of guidance and counselling.
2. describe the characteristics and functions of guidance and counselling.
3. state the basic principles of guidance and counselling.
4. explain the types and areas of guidance and counselling.
5. use various tools and techniques of guidance in appropriate context.
6. explain the qualities and role of a counsellor.

Unit	Contents: Content	Marks	L	P	T
I	<p><b>Guidance:</b></p> <p>1.1 Meaning, Nature, Definition and Scope of Guidance</p> <p>1.2 Aims and Objectives of Guidance</p> <p>1.3 Need of Guidance</p> <p>1.4 Principles of Guidance</p> <p>1.5 Philosophical, Psychological and Sociological bases of Guidance.</p> <p>1.6 Types of Guidance :</p> <ul style="list-style-type: none"> <li>● Personal guidance &amp; Social guidance</li> <li>● Educational guidance</li> <li>● Vocational guidance</li> <li>● Health guidance</li> <li>● Individual and Group Guidance</li> </ul> <p><b>Guidance at Various Levels:</b></p> <p>1.7 Guidance at Pre-school education</p> <p>1.8 Guidance at Elementary education level</p> <p>1.9 Guidance at Secondary education level</p> <p>1.10 Guidance at Higher education level</p> <p>1.11 Importance of good guidance programme</p>	16	2	I	3
			1		
			1		
			1		
			3		
			5		
			5		
			1		

(ডিব্ৰুগড় বিশ্ববিদ্যালয়ৰ ২০১৯-২০ শিক্ষাবৰ্ষৰ পৰা প্ৰবৰ্তন হোৱা পছন্দভিত্তিক মূল্যাকেন  
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EDNH501, ষষ্ঠ বাৰ্ষিকিক EDDSEN602 আৰু GEEDN601 ৰ বাবে অনুমোদিত  
পাঠ্যক্ৰমৰ ভিত্তিত ৰচিত পাঠ্যপুথি)

# স্বাধীনোত্তৰ ভাৰতৰ শিক্ষা

## EDUCATION IN POST INDEPENDENT INDIA



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অংকিতা লাহন

অংকিতা বৰুৱা  
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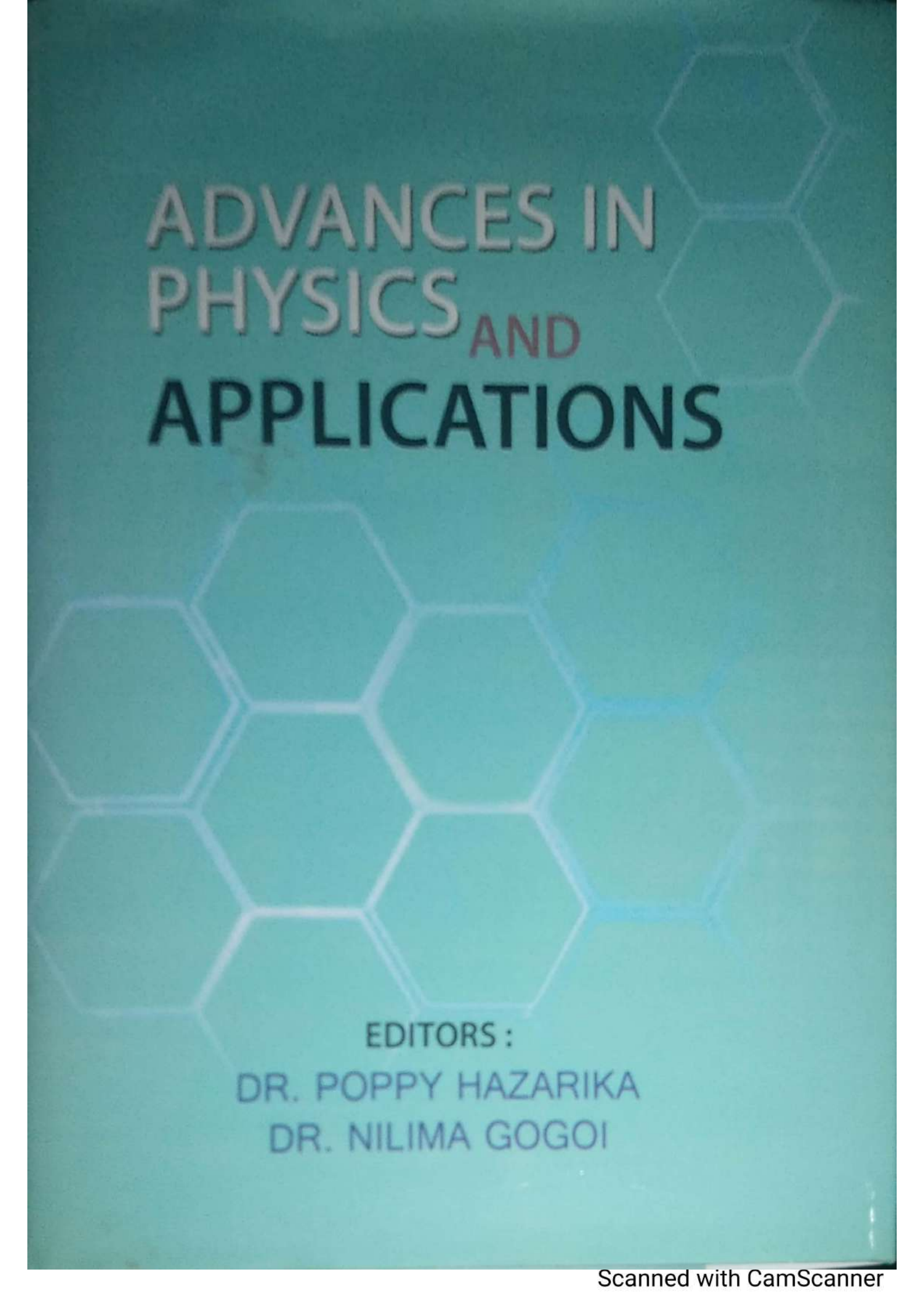
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**EDNH501: EDUCATION IN POST-INDEPENDENT INDIA**  
**CREDIT: 6**  
**MARKS: 100 (IN-SEMESTER 20; END-SEMESTER 80)**

**Expected Learning Outcome:** On completion of the course, the students will be able to:

1. describe the educational scenario at the time of Independence
2. explain the roles of various Commissions and Committees in the development of education in post independent India.
3. describe the recent educational developments in India

Unit	Content	Marks	L	P	T
I	<b>Educational scenario at the time of Independence</b>	20	(18)		4
	1.1 A brief account of educational scenario at the time of Independence		1		
	1.2 University Education Commission, 1948-49		1		
	- Aims of University Education		1		
	- Reforms of curriculum		1		
	- Administration and Funding		1		
	- Teaching and Research		1		
	- Vocational Education		1		
	- Women's Education		1		
	- Examination reform		1		
	- Students Welfare		1		
	- Implications of University Education Commission's recommendations in present Education system		1		
	1.3 Education in the Indian Constitution:		1		
	- Introduction: Preamble of the Constitution.				



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## Chapter 13: SPIN POLARIZED FERROMAGNETISM IN HALF METALLIC FE DOPED ZNO

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### Abstract

Based on first principle calculations using GGA+U approach, we have studied the origin of room temperature ferromagnetism in Fe doped ZnO. The ferromagnetic coupling and the contribution of Fe-d states on the ferromagnetism of ZnO are studied. The p-d exchange interaction between the Fe-d and O-p states is responsible for the ferromagnetism at lower Fe concentration in ZnO, whereas at the higher concentration, the enhanced short range antiferromagnetic coupling between Fe ions dominates over ferromagnetism. The DOS results depicts that the Fe- $d_{12g}$  state predominantly contributes the hybridization at the fermi level resulting the magnetism in the Fe doped ZnO system. The total energy calculations reveal the existence of short range ferromagnetic coupling in the system.

**Keywords-** Diluted magnetic semiconductors, Ferromagnetism, Density of states

### 1. Introduction

In the recent years, Diluted magnetic semiconductors (DMS) have been discerning materials with greater applications in spintronic devices due to their remarkable spin polarized property [1, 2]. In order to enhance the performances of spintronic devices such as magnetic storages and sensors, researchers have been focusing on transition metal (Fe, Mn, Ni, Co. etc.) doped DMSs [3-5]. Doping of transition metal elements into the DMS materials invoke magnetic coupling by inducing spin polarization in those materials [6, 7]. Among all DMSs, ZnO is the most suitable candidate for spintronics application due to its abundance and environment-friendly nature also a suitable optoelectronic material with a wide band gap 3.3 eV [8, 9]. It is essential to recognize the physical mechanisms responsible for the RTFM in these materials from both fundamental and technological prospective. Being a superior ferromagnetic transition metal with high curie temperature, it is convenient to use Fe as a doping agent in ZnO in order to introduce ferromagnetism into it [10, 11]. The exchange interactions between the unfilled d states of Fe contributes the RTFM in Fe doped ZnO.

In this report we have studied the magnetic properties of Fe doped ZnO and performed spin polarized DFT calculations using GGA+U approach to investigate the actual mechanisms responsible for the origin of RTFM in Fe doped ZnO. The magnetic coupling, formation energy and the magnetic moment are calculated and analyzed the effect of Fe-d state on the ferromagnetism of ZnO.

### 2. Experimental and Computational details

Nanoparticles of Fe-doped ZnO are synthesized by chemical co-precipitation method using zinc acetate [ $Zn(CH_3COOH)_2 \cdot 2H_2O$ ] and sodium hydroxide (NaOH) as the precursor and ferric nitrate [ $Fe(NO_3)_3 \cdot 9H_2O$ ] as dopant. By varying the molar concentration of ferric nitrate we have prepared Fe doped ZnO nanoparticles at doping percentages of 1%, 3%, 5%, 7% and 10%.

DFT calculations are executed by full-potential linearized augmented plane wave plus local orbital (FP-LAPW + lo) method implemented in the Wien2k package [12]. Perdew - Burke - Ernzerhof generalized gradient approximation with the Hubbard correction (GGA+U) is used for the exchange correlation potential [13, 14]. A plane wave cut off of  $RK_{max} = 6$  is used for self-consistence method and 1000 k-points with  $10 \times 10 \times 10$  k-mesh are used the sampling of brillouin zone. We have



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## Chapter – 11

### Gender Equality and Politics in Assam with Special Reference to the Sixth Schedule Area

- *Lianneithang Hrangkhoh*

#### Introduction

Equality between men and women is a matter of human rights and a condition for social justice and is also a necessary and fundamental pre-requisite for equality, development and peace. So, far the success of Indian democracy is concerned both male and female should participate in the democratic institutions of the country. But in the male dominated Indian society, the participation of women in democratic institution is not to the expected level. The women of the country should be involved in the decision making process to protect their interest while decision are made. The importance of women's political participation for a viable democratic polity is being increasingly realized in all corners of the world. Women as a group have problem, demands and aspirations, which cannot be aptly expressed by men. The constitution of India gives equal political right to both men and women. The term 'political participation' is not just casting of votes, it also means some other activities like contesting election, membership of political party and representative bodies, attending party meeting, communication with leaders, electoral campaigning, demonstration, holding party position, participation in decision making and policy making and other related activities. Gender equality implies 50% representation by women. In parliamentary election, the representative of women is very less in compare with men. Women's consists of almost half of the population of the country but still remain away from the policy making and decision making process. The Sixth Schedule of the Indian Constitution provides separate administration for the tribal of Northeast India. The Sixth Schedule is entirely focused at protection of tribal areas and interests, by allowing self-governance through constitutional institution at the district or regional levels. These institutions are entrusted with the twin task of protecting tribal culture and customs and undertaking development tasks. Traditional systems have largely excluded the participation of women from local governance. The 73rd amendment of the constitution provides reservation for women in

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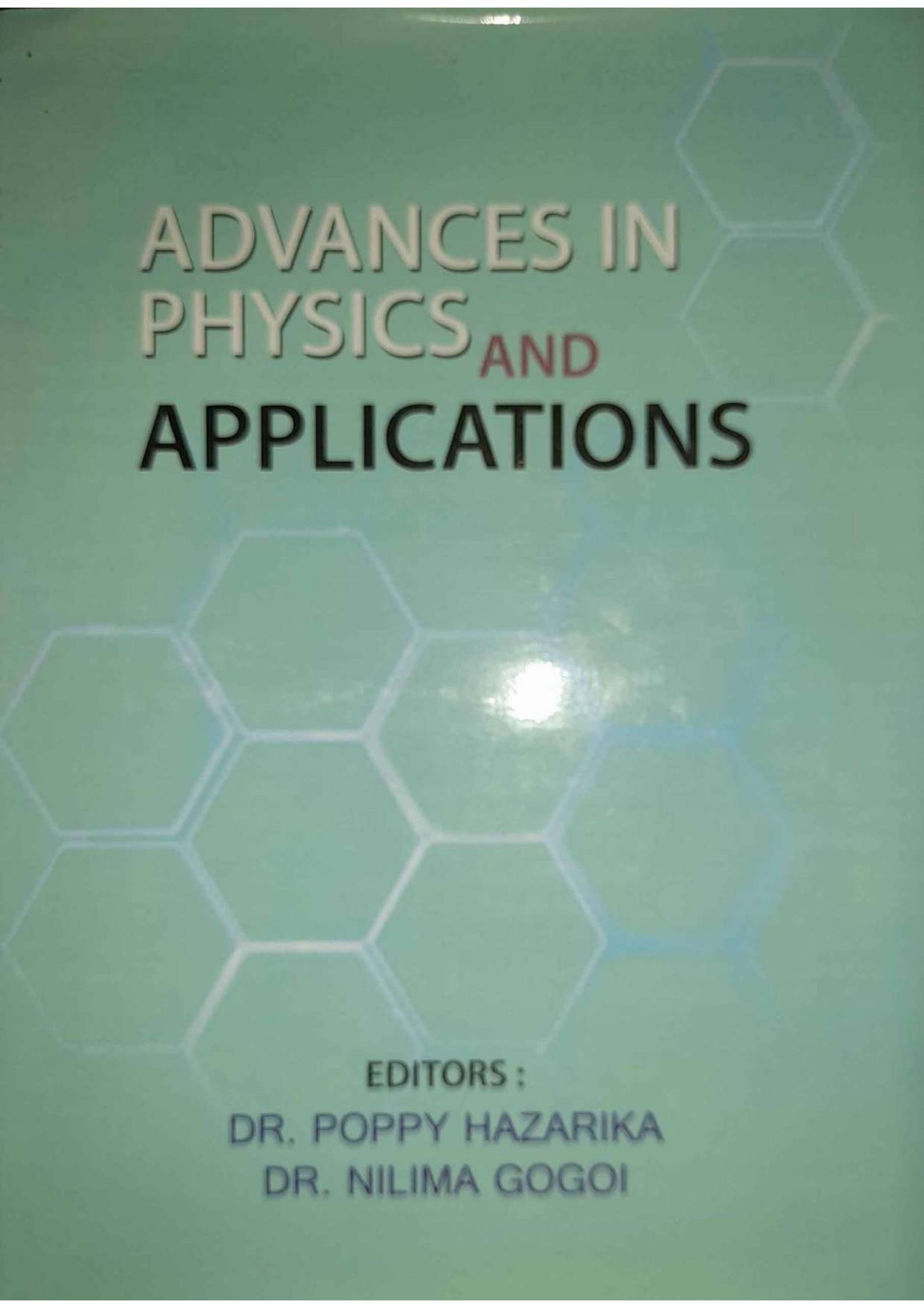
Dr. Poppy Hazarika is currently working as an Assistant Professor, Department of Physics, Duliajan College, Duliajan since February, 2015. She is also serving as Head of the Department, Department of Physics, Duliajan College, Duliajan since January, 2020. She has completed her M.Sc and Ph.D from the Department of Physics, Dibrugarh University. She has also worked as JRF in a collaborative project under Dibrugarh University and TIFR, Mumbai. Her area of research is High Energy Physics. She has participated in many national, international seminars, workshops, conferences, FDPs, STCs etc. and published papers in referred international journals. Along with teaching, currently she is also engaged in many research activities. She has also published a book titled "Thermal Physics" for Semester III CBCS syllabus under Vishal Publishing Co., Jalandhar, India.



Dr. Nilima Gogoi is an Assistant Professor in the Department of Physics, Duliajan College, Duliajan, Assam, India. She is having more than 6 years of teaching experience in undergraduate and postgraduate level. After obtaining her masters degree in Physics from the Department of Physics, Dibrugarh University, Assam, she did her Ph.D. in Electronics and Communication Engineering from Tezpur University, Assam. She also cleared UGC-SET in the year 2015. Her area of research is Optical Communication. She has more than six years of research experience and currently also engaged in many research activities along with teaching. She has published more than 06 papers in referred international journals.







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## Chapter 10: LATERAL DENSITY DISTRIBUTIONS OF CHERENKOV PHOTONS IN EASS PARAMETERISED AS A FUNCTION OF PRIMARY ENERGY (E)

P. Hazarika

Duliajan College, Duliajan-786602

E.mail: poppyhazarika1@gmail.com

### Abstract

The CORSIKA simulation code was used to simulate the lateral density distributions of Cherenkov photons in Extensive Air Showers (EASs) for a wide range of primary energy: from 100 GeV to 100 TeV and incident zenith angles from  $0^\circ$  to  $40^\circ$  over different altitudes of observation. Using these simulations we obtained a parameterisation of lateral density distributions ( $\rho_{ch}$ ) as a function of energy for the primary  $\gamma$ -ray photons, protons and iron nuclei. This kind of parameterisation significantly contribute towards an understanding of the process of primary particle identification, reconstruction of the shower observables and an efficient disentanglement of the  $\gamma$ -ray showers from the hadronic showers. It can be seen from our parameterisation analysis that the lateral density ( $\rho_{ch}$ ) distributions of Cherenkov photons follow a functional form  $\rho_{ch}(E) = aE^b$  for the three given primaries at all the different values of zenith angle ( $\theta$ ), altitude of observation ( $H$ ) and distance from the shower core ( $R$ ), but with different values of function parameters ( $a$ ) and ( $b$ ).

**Keywords:** Gamma-ray Astronomy; Cherenkov Radiation; CORSIKA; EASs

### 1. Introduction

The understanding of origin, propagation and acceleration mechanisms of Cosmic Rays (CRs) constantly impinging the Earth's atmosphere with extraterrestrial particles of high, ultra-high, and extremely high energy remains one of the major unsolved problems till date in the field of CR research (Nakamura et al. 2010; Gaisser 1990; Blasi 2013; Bhattacharjee & Sigl 2000). The primary energy of CRs extends over twelve decades of energy with bulk of the CRs originating from within our galaxy. These CRs mainly consist of charged particles and are deflected isotropically in the intragalactic magnetic fields and thereby reaches us with no information regarding their source(s) direction(s). However, the sources that emit these CRs also emit  $\gamma$ -rays which are neutral and do not loose their direction during propagation. Thus instead of CRs, the detection of these competing  $\gamma$ -rays can also help us in determining the locations of such celestial sources. One of the techniques that is extensively used for such purposes is the Atmospheric Cherenkov Technique (ACT). ACTs mainly consist of ground based telescopes operating within the energy range of some hundred GeV to few TeV (Ong 1998; Holder 2015). The process is indirect and depends on the registration of a very brief flash of blue light known as the Cherenkov radiation. These radiations are emitted in the  $\gamma$ -ray initiated EASs due to the interaction of relativistic charged particles present in it and the atmospheric particles (Hoffman & Sinnis 1999; Weekes 2008; Bhat 2002). The method being indirect, necessitates the use of Monte Carlo simulations to properly analyze the data of the Cherenkov detectors. Synergy between the simulations and the real data ensures proper calibration of the detector array, effective rejection of the CR background, efficient determination of the primary energies and the incident  $\gamma$ -ray's arrival directions. From time to time various researchers from the field of High Energy Physics have carried out extensive studies to establish the dependence of the lateral density and arrival time distributions of Cherenkov photons on the energy of the primary, type of the primary particle, the radial distance from the shower axis, the direction of the shower axis (zenith angle) and the altitude of observation level (Chitnis & Bhat 2001; Al-Rubaiee et al. 2005; Abdulstar et al. 2016). A spherical

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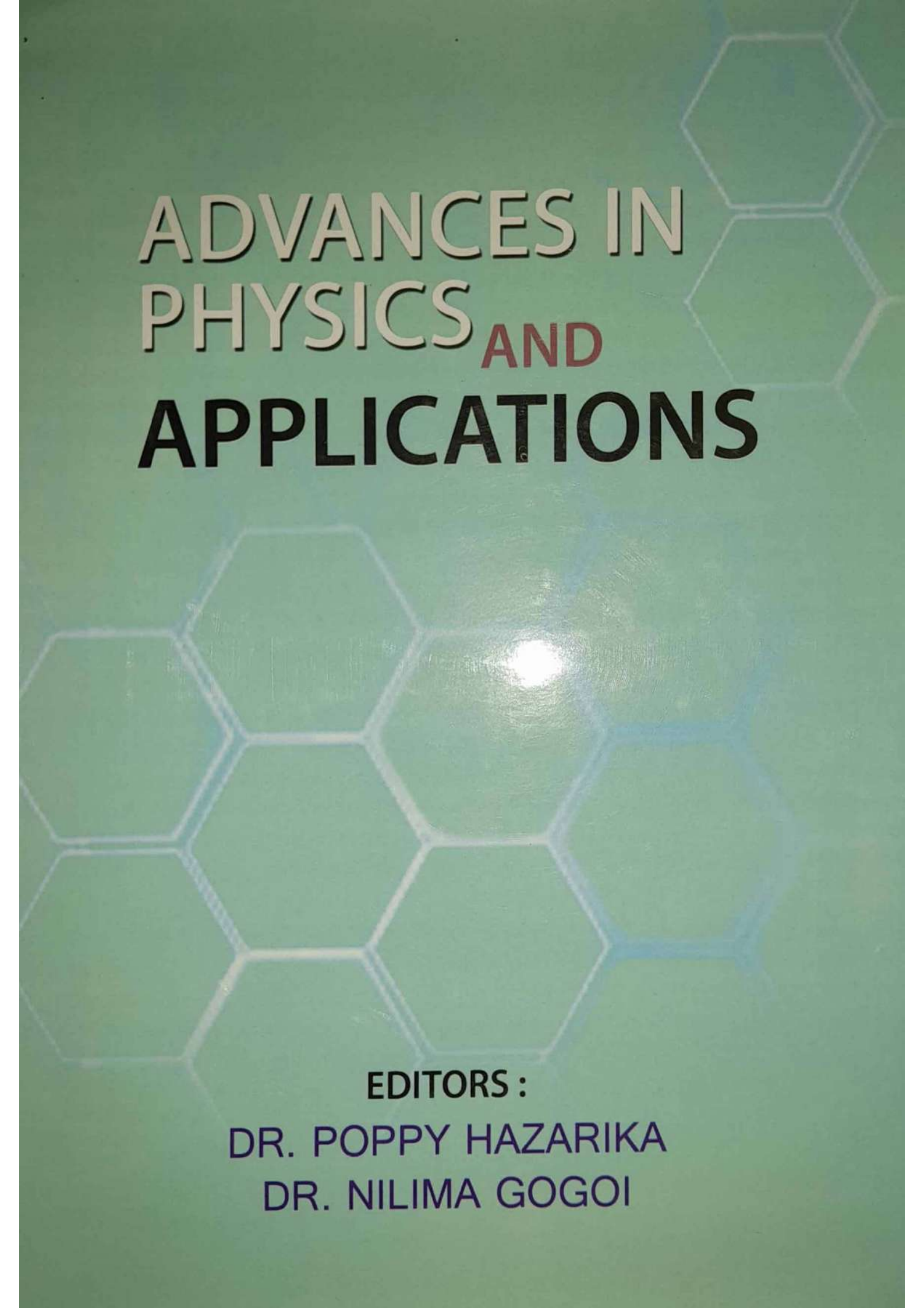


Dr. Poppy Hazarika is currently working as an Assistant Professor, Department of Physics, Duliajan College, Duliajan since February, 2015. She is also serving as Head of the Department, Department of Physics, Duliajan College, Duliajan since January, 2020. She has completed her M.Sc and Ph.D from the Department of Physics, Dibrugarh University. She has also worked as JRF in a collaborative project under Dibrugarh University and TIFR, Mumbai. Her area of research is High Energy Physics. She has participated in many national, international seminars, workshops, conferences, FDPs, STCs etc. and published papers in referred international journals. Along with teaching, currently she is also engaged in many research activities. She has also published a book titled "Thermal Physics" for Semester III CBCS syllabus under Vishal Publishing Co., Jalandhar, India.



Dr. Nilima Gogoi is an Assistant Professor in the Department of Physics, Duliajan College, Duliajan, Assam, India. She is having more than 6 years of teaching experience in undergraduate and postgraduate level. After obtaining her masters degree in Physics from the Department of Physics, Dibrugarh University, Assam, she did her Ph.D. in Electronics and Communication Engineering from Tezpur University, Assam. She also cleared UGC-SET in the year 2015. Her area of research is Optical Communication. She has more than six years of research experience and currently also engaged in many research activities along with teaching. She has published more than 06 papers in referred international journals.





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## Chapter 11: A REVIEW ON APPLICATION OF UV SPECTROPHOTOMETRY FOR DETECTION OF FOOD FRAUD

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### Abstract

Economically motivated adulteration (EMA) or food fraud has become a world-scale problem in the present day economy. In order to fight food fraud, many analytical approaches are being adopted from time to time. The UV Visible spectrophotometric analysis is a basic analytical technique employed for the detection of food frauds. This method can be used for the analysis of both inorganic and organic molecules as well as some complex mixtures. This chapter provides a brief idea of the UV-Vis spectrophotometric technique and also discusses some applications of UV-Vis spectrophotometry for detection of food fraud.

**Keywords:** Economically motivated adulteration (EMA), Food fraud, UV-Visible spectrophotometry

### 1. Introduction

The adulteration of various types of food materials has become a matter of concern in today's day-to-day life. Economically modified adulteration (EMA), also commonly known as food fraud, is the process of substituting one or more ingredients of food or other types of intentional modification of food in order to gain profit [1]. In today's economic world, the issue of food fraud has become a world scale problem. In this direction, many different analytical methods are being adopted for the detection (and prevention) of EMA in food. One such method is the use of UV-visible spectrophotometry [2-12]. The UV-visible spectrophotometric method [13] is one of the oldest methods used in molecular spectroscopy and is based on the study of the absorption spectrum of various materials. This article discusses the use of the UV-visible spectrophotometric method for the prevention of EMA. The first part of the article gives a basic idea on UV-visible spectrophotometry, whereas the later part will provide a brief discussion on the use of this technique for the detection of intentional adulteration of food.

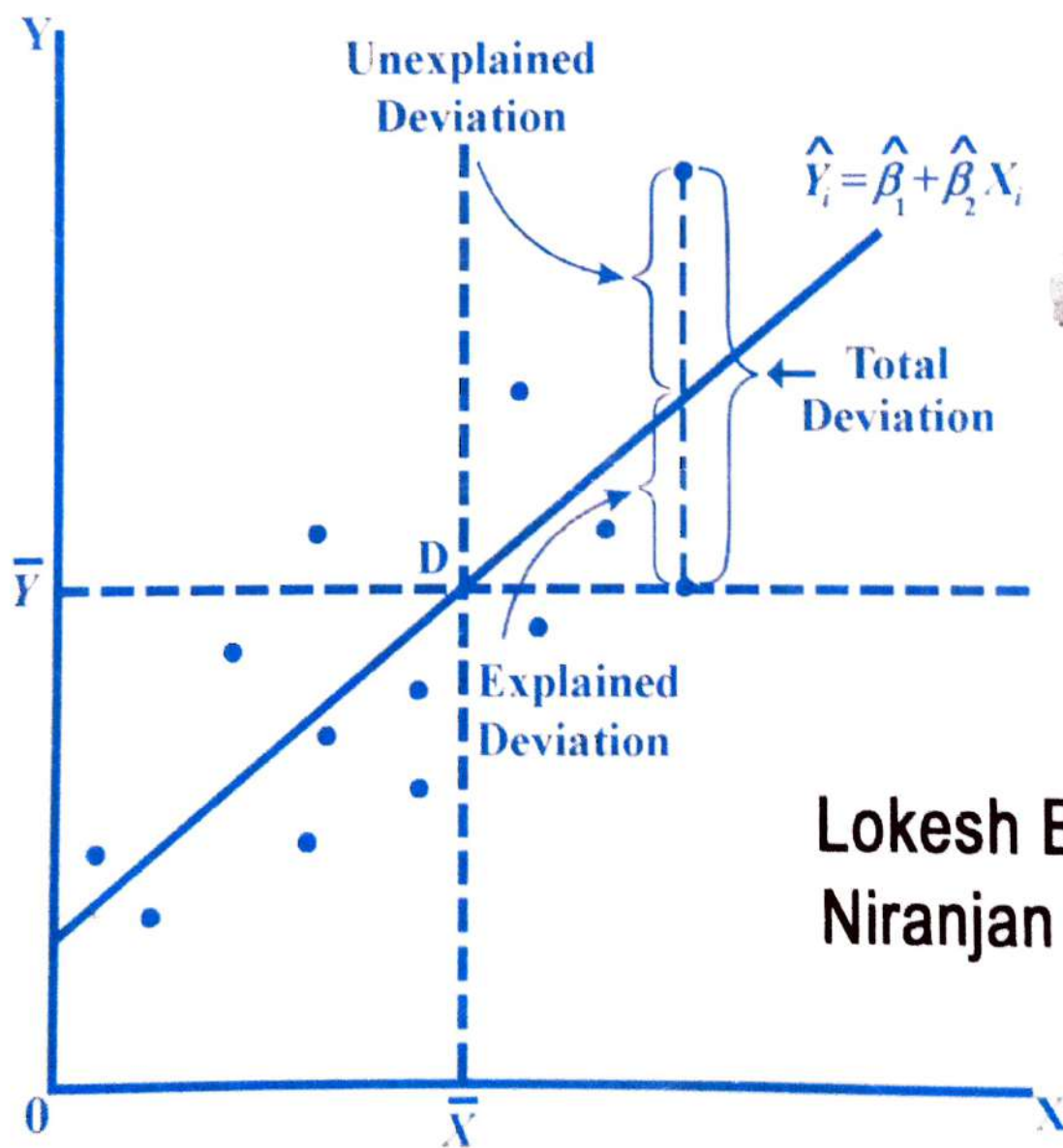
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The basic principle of the spectrophotometer is based on the Beer-Lambert law (also known as the Bouguer-Lambert-Beer Law) which relates the reduction of intensity of light passing through a solution to the concentration of the solution and the path length of light through that solution [13]. According to this law, if 'a' be the molar attenuation coefficient or absorptivity of the attenuating

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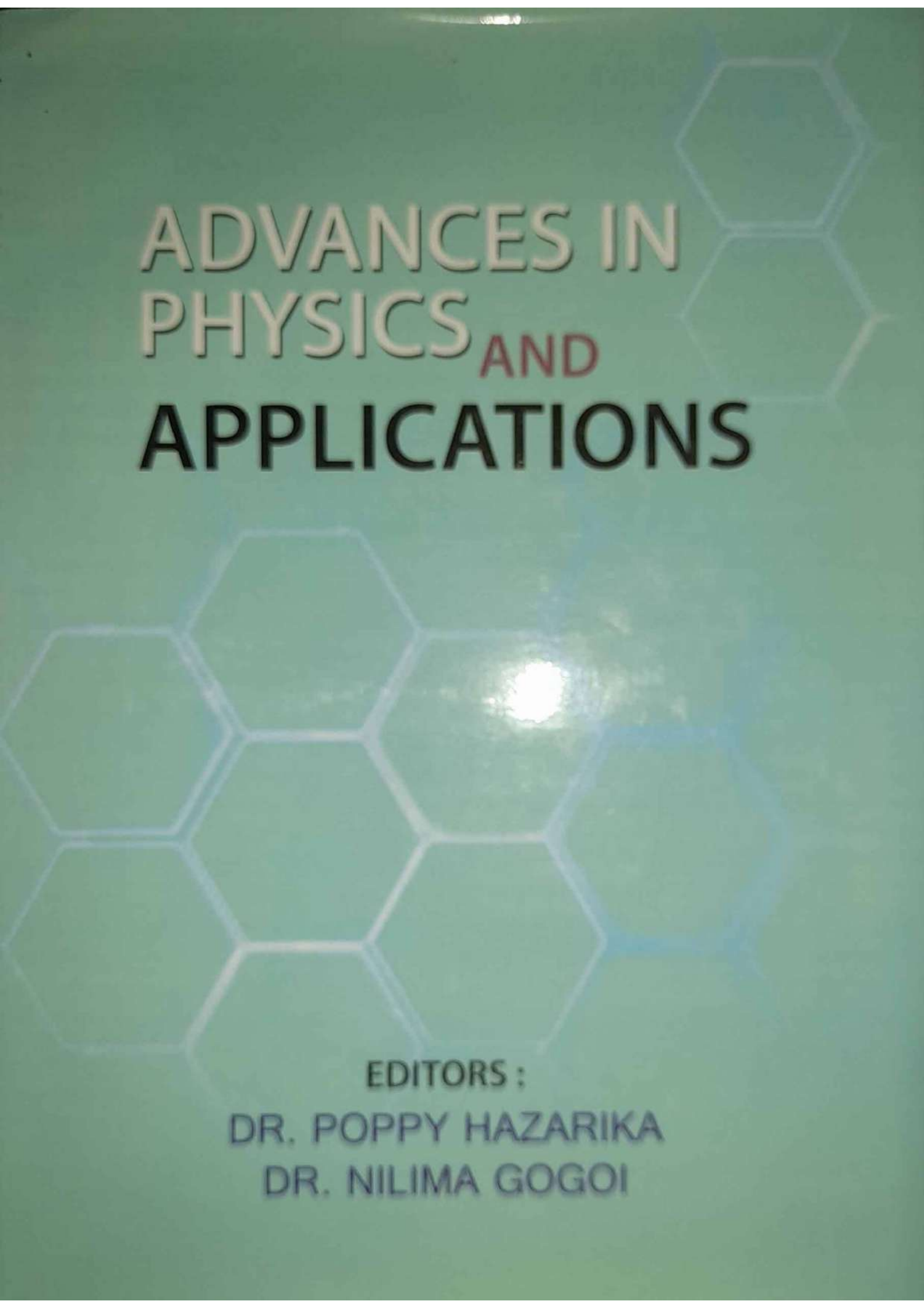
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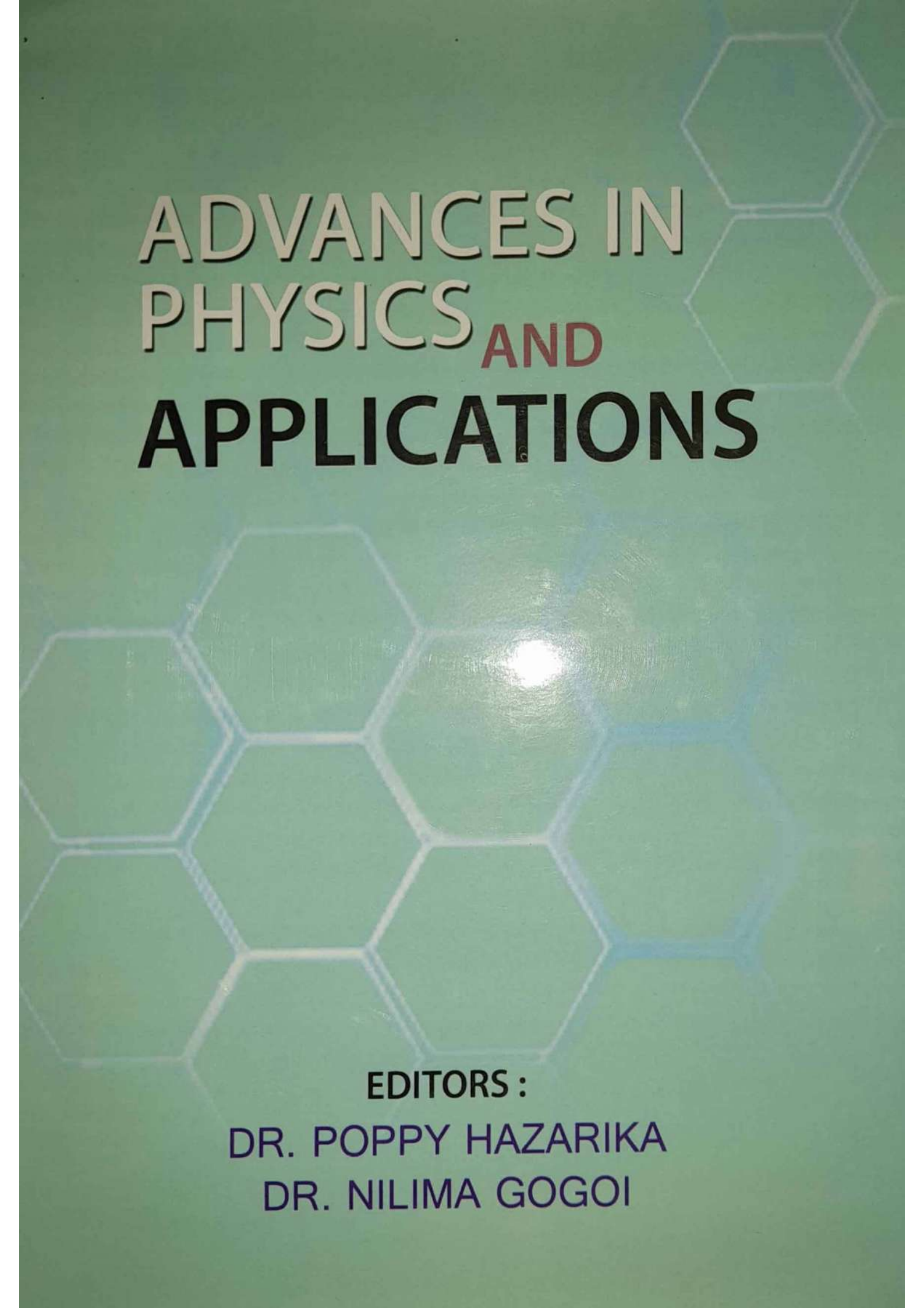
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Duliajan College, a premier institution of higher education in Duliajan was started on 1st of August, 1969. Making a humble beginning with just 100 students, the college has grown in strength and at present it has more than 2000 students in Arts, Science and Commerce Streams. With a sprawling and scenic campus of around 15 acres, the college is well equipped with all the basic facilities - library, laboratory, hostels (both boys and girls), canteen, museum, auditorium, playground and indoor stadium. The college believes in making education more relevant to the real.

### About the department

The department of Physics of Duliajan College started with eminent faculty like Dr. Jayanti Chutia. The first batch of undergraduate BSc Honours in Physics under Dibrugarh University graduated in 1992. Currently, the department has four permanent faculties. The department offers Physics Honors, and Physics Generic (with honors in other subjects) and Higher Secondary (Physics). The first volume of this book series was published in 2021 under the editorship of Dr. Poppy Hazarika and Dr. Nilima Gogoi. The department plans to continue this endeavor by publishing more books in the future including both research based and subject oriented books.

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## Chapter 10: LATERAL DENSITY DISTRIBUTIONS OF CHERENKOV PHOTONS IN EASS PARAMETERISED AS A FUNCTION OF PRIMARY ENERGY (E)

P. Hazarika

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### Abstract

The CORSIKA simulation code was used to simulate the lateral density distributions of Cherenkov photons in Extensive Air Showers (EASs) for a wide range of primary energy: from 100 GeV to 100 TeV and incident zenith angles from  $0^\circ$  to  $40^\circ$  over different altitudes of observation. Using these simulations we obtained a parameterisation of lateral density distributions ( $\rho_{ch}$ ) as a function of energy for the primary  $\gamma$ -ray photons, protons and iron nuclei. This kind of parameterisation significantly contribute towards an understanding of the process of primary particle identification, reconstruction of the shower observables and an efficient disentanglement of the  $\gamma$ -ray showers from the hadronic showers. It can be seen from our parameterisation analysis that the lateral density ( $\rho_{ch}$ ) distributions of Cherenkov photons follow a functional form  $\rho_{ch}(E) = aE^b$  for the three given primaries at all the different values of zenith angle ( $\theta$ ), altitude of observation ( $H$ ) and distance from the shower core ( $R$ ), but with different values of function parameters ( $a$ ) and ( $b$ ).

**Keywords:** Gamma-ray Astronomy; Cherenkov Radiation; CORSIKA; EASs

### 1. Introduction

The understanding of origin, propagation and acceleration mechanisms of Cosmic Rays (CRs) constantly impinging the Earth's atmosphere with extraterrestrial particles of high, ultra-high, and extremely high energy remains one of the major unsolved problems till date in the field of CR research (Nakamura et al. 2010; Gaisser 1990; Blasi 2013; Bhattacharjee & Sigl 2000). The primary energy of CRs extends over twelve decades of energy with bulk of the CRs originating from within our galaxy. These CRs mainly consist of charged particles and are deflected isotropically in the intragalactic magnetic fields and thereby reaches us with no information regarding their source(s) direction(s). However, the sources that emit these CRs also emit  $\gamma$ -rays which are neutral and do not loose their direction during propagation. Thus instead of CRs, the detection of these competing  $\gamma$ -rays can also help us in determining the locations of such celestial sources. One of the techniques that is extensively used for such purposes is the Atmospheric Cherenkov Technique (ACT). ACTs mainly consist of ground based telescopes operating within the energy range of some hundred GeV to few TeV (Ong 1998; Holder 2015). The process is indirect and depends on the registration of a very brief flash of blue light known as the Cherenkov radiation. These radiations are emitted in the  $\gamma$ -ray initiated EASs due to the interaction of relativistic charged particles present in it and the atmospheric particles (Hoffman & Sinnis 1999; Weekes 2008; Bhat 2002). The method being indirect, necessitates the use of Monte Carlo simulations to properly analyze the data of the Cherenkov detectors. Synergy between the simulations and the real data ensures proper calibration of the detector array, effective rejection of the CR background, efficient determination of the primary energies and the incident  $\gamma$ -ray's arrival directions. From time to time various researchers from the field of High Energy Physics have carried out extensive studies to establish the dependence of the lateral density and arrival time distributions of Cherenkov photons on the energy of the primary, type of the primary particle, the radial distance from the shower axis, the direction of the shower axis (zenith angle) and the altitude of observation level (Chitnis & Bhat 2001; Al-Rubaiee et al. 2005; Abdulstar et al. 2016). A spherical

## About the Editors:



Dr. Poppy Hazarika is currently working as an Assistant Professor, Department of Physics, Duliajan College, Duliajan since February, 2015. She is also serving as Head of the Department, Department of Physics, Duliajan College, Duliajan since January, 2020. She has completed her M.Sc and Ph.D from the Department of Physics, Dibrugarh University. She has also worked as JRF in a collaborative project under Dibrugarh University and TIFR, Mumbai. Her area of research is High Energy Physics. She has participated in many national, international seminars, workshops, conferences, FDPs, STCs etc. and published papers in referred international journals. Along with teaching, currently she is also engaged in many research activities. She has also published a book titled "Thermal Physics" for Semester III CBCS syllabus under Vishal Publishing Co., Jalandhar, India.



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# *Advances in Physics and its Applications*

Volume II

## Editors

Dr. Poppy Hazarika

Dr. Nilima Gogoi

Ms. Bhagyalakhi Baruah

Dr. Dipraj Saikia

# **Advances in Physics and its Applications**

## **Volume II**

Editors:

**Dr. Poppy Hazarika**

**Dr. Nilima Gogoi**

**Ms. Bhagyalakhi Baruah**

**Dr. Dipraj Saikia**

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Duliajan College, Duliajan

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### About the college

Duliajan College, a premier institution of higher education in Duliajan was started on 1st of August, 1969. Making a humble beginning with just 100 students, the college has grown in strength and at present it has more than 2000 students in Arts, Science and Commerce Streams. With a sprawling and scenic campus of around 15 acres, the college is well equipped with all the basic facilities - library, laboratory, hostels (both boys and girls), canteen, museum, auditorium, playground and indoor stadium. The college believes in making education more relevant to the real.

### About the department

The department of Physics of Duliajan College started with eminent faculty like Dr. Jayanti Chutia. The first batch of undergraduate BSc Honours in Physics under Dibrugarh University graduated in 1992. Currently, the department has four permanent faculties. The department offers Physics Honors, and Physics Generic (with honors in other subjects) and Higher Secondary (Physics). The first volume of this book series was published in 2021 under the editorship of Dr. Poppy Hazarika and Dr. Nilima Gogoi. The department plans to continue this endeavor by publishing more books in the future including both research based and subject oriented books.

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# ADVANCES IN PHYSICS **AND** **APPLICATIONS**

**EDITORS :**

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**DR. NILIMA GOGOI**



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## Chapter 10: LATERAL DENSITY DISTRIBUTIONS OF CHERENKOV PHOTONS IN EASS PARAMETERISED AS A FUNCTION OF PRIMARY ENERGY (E)

P. Hazarika

Duliajan College, Duliajan-786602

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### Abstract

The CORSIKA simulation code was used to simulate the lateral density distributions of Cherenkov photons in Extensive Air Showers (EASs) for a wide range of primary energy: from 100 GeV to 100 TeV and incident zenith angles from  $0^\circ$  to  $40^\circ$  over different altitudes of observation. Using these simulations we obtained a parameterisation of lateral density distributions ( $\rho_{ch}$ ) as a function of energy for the primary  $\gamma$ -ray photons, protons and iron nuclei. This kind of parameterisation significantly contribute towards an understanding of the process of primary particle identification, reconstruction of the shower observables and an efficient disentanglement of the  $\gamma$ -ray showers from the hadronic showers. It can be seen from our parameterisation analysis that the lateral density ( $\rho_{ch}$ ) distributions of Cherenkov photons follow a functional form  $\rho_{ch}(E) = aE^b$  for the three given primaries at all the different values of zenith angle ( $\theta$ ), altitude of observation ( $H$ ) and distance from the shower core ( $R$ ), but with different values of function parameters ( $a$ ) and ( $b$ ).

**Keywords:** Gamma-ray Astronomy; Cherenkov Radiation; CORSIKA; EASs

### 1. Introduction

The understanding of origin, propagation and acceleration mechanisms of Cosmic Rays (CRs) constantly impinging the Earth's atmosphere with extraterrestrial particles of high, ultra-high, and extremely high energy remains one of the major unsolved problems till date in the field of CR research (Nakamura et al. 2010; Gaisser 1990; Blasi 2013; Bhattacharjee & Sigl 2000). The primary energy of CRs extends over twelve decades of energy with bulk of the CRs originating from within our galaxy. These CRs mainly consist of charged particles and are deflected isotropically in the intragalactic magnetic fields and thereby reaches us with no information regarding their source(s) direction(s). However, the sources that emit these CRs also emit  $\gamma$ -rays which are neutral and do not loose their direction during propagation. Thus instead of CRs, the detection of these competing  $\gamma$ -rays can also help us in determining the locations of such celestial sources. One of the techniques that is extensively used for such purposes is the Atmospheric Cherenkov Technique (ACT). ACTs mainly consist of ground based telescopes operating within the energy range of some hundred GeV to few TeV (Ong 1998; Holder 2015). The process is indirect and depends on the registration of a very brief flash of blue light known as the Cherenkov radiation. These radiations are emitted in the  $\gamma$ -ray initiated EASs due to the interaction of relativistic charged particles present in it and the atmospheric particles (Hoffman & Sinnis 1999; Weekes 2008; Bhat 2002). The method being indirect, necessitates the use of Monte Carlo simulations to properly analyze the data of the Cherenkov detectors. Synergy between the simulations and the real data ensures proper calibration of the detector array, effective rejection of the CR background, efficient determination of the primary energies and the incident  $\gamma$ -ray's arrival directions. From time to time various researchers from the field of High Energy Physics have carried out extensive studies to establish the dependence of the lateral density and arrival time distributions of Cherenkov photons on the energy of the primary, type of the primary particle, the radial distance from the shower axis, the direction of the shower axis (zenith angle) and the altitude of observation level (Chitnis & Bhat 2001; Al-Rubaiee et al. 2005; Abdulstar et al. 2016). A spherical

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(ডিব্ৰুগড় বিশ্ববিদ্যালয়ৰ ২০১৯-২০ শিক্ষাবৰ্ষৰ পৰা প্ৰবৰ্ত্তন হোৱা পছন্দভিত্তিক মূল্যায়ন ব্যৱস্থা (CBCS)ৰ  
তিনিবছৰীয়া স্নাতক মহলাৰ পাঠ্যক্ৰমৰ পঞ্চম বাৰ্ষিকৰ সন্মান (Honours) বিষয়ৰ EDNH-502 কাকতৰ অনুমোদিত  
পাঠ্যক্ৰমৰ ভিত্তিত যুগুত কৰা পাঠ্যপুথি)



স্নাতক মহলাৰ  
বিশ্বৰপ্ৰেক্ষাপটত শিক্ষা  
EDUCATION IN WORLD  
PERSPECTIVE

ড° দেইজী বাণী চুতীয়া  
ড° মনচুন হাতীৰকাৰা  
ড° স্বপ্নালী বৰা

Unit	Content	Marks	L	P	T
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II	<b>2.1</b> Historical perspective of the development of the study: <ul style="list-style-type: none"> <li>• Travellers' tales.</li> <li>• Educational problems</li> <li>• Interaction of society and education.</li> <li>• Quantitative approach.</li> <li>• Scientific approach</li> </ul> <b>2.2</b> Methods of studying National Systems of Education <ul style="list-style-type: none"> <li>• Descriptive method.</li> <li>• Historical method.</li> <li>• Sociological method.</li> <li>• Statistical method.</li> <li>• Psychological method.</li> <li>• Scientific method.</li> </ul>	20	(16)	6	4
III	Development of education with respect to Salient features, organization, administration and Curriculum of Primary/ Elementary, Secondary and Higher education of UK, USA, India and Japan. <ul style="list-style-type: none"> <li>• UK</li> <li>• USA</li> <li>• India</li> <li>• Japan</li> </ul>	20	(16)	6	4

যুক্তৰাজ্য, আমেৰিকা যুক্তৰাষ্ট্ৰ, ভাৰত আৰু জাপানৰ শিক্ষাৰ বিকাশ আৰু  
প্ৰাথমিক, প্ৰাথমিক, মাধ্যমিক আৰু উচ্চতৰ শিক্ষাৰ লক্ষ্য, উদ্দেশ্য, বৈশিষ্ট্য  
সংগঠন, প্ৰশাসন আৰু পাঠ্যক্ৰমক সামৰিঃ

(Development of education with respect to Salient features of  
organization, administration and Curriculum of Primary,  
Elementary, Secondary and Higher education of U.K., USA,  
India and Japan.)

যুক্তৰাজ্যৰ শিক্ষাৰ বিকাশ (Development of Education in U.K.):

উনৈশ শতিকাৰ পূৰ্বতে গীৰ্জা আৰু অন্যান্য ধৰ্মানুষ্ঠানসমূহৰ দ্বাৰা পৰিচালিত  
কিছু শিক্ষা ব্যৱস্থাৰ প্ৰচলন যুক্তৰাজ্যত দেখা পোৱা গৈছিল। গীৰ্জাসমূহে এই শিক্ষা  
ব্যৱস্থা কেৱল তেওঁলোকৰ ঘনিষ্ঠ অনুগামী সকলৰ বাবেহে কৰিছিল য'ত শিক্ষা  
বাবে নামভৰ্তি হোৱা ছাত্ৰসকলে গৃহৰ লগত সম্পূৰ্ণ সম্পৰ্ক ছেদ কৰি জীৱন গীৰ্জা  
নামত উছৰ্গা কৰিছিল। কাৰেং বিদ্যালয়ৰ (Palace School) ৰ দ্বাৰা ৰাজ পৰিয়াল  
সদস্যৰ লগতে তেওঁলোকৰ আত্মীয়-স্বজনৰ সতি-সন্তানসকলকো শিক্ষা প্ৰদানৰ ব্যৱস্থা  
আলফ্ৰেড দি গ্ৰেটৰ দিনৰ পৰা কৰি অহা হৈছিল। আনহাতে সেই সময়ত সৰ্বসাধাৰণ  
শ্ৰেণীৰ বাবে কোনো ধৰণৰ শিক্ষাৰ সুবিধা প্ৰদান কৰা হোৱা নাছিল কেৱল কেত  
'ধৰ্মোত্তৰ বিদ্যালয়ে'হে সেইসকল সাধাৰণ প্ৰজাৰ বাবে শিক্ষাৰ সুবিধা প্ৰদান কৰি  
সেই সময়ৰ ধৰ্মোত্তৰ বিদ্যালয়সমূহে গীৰ্জাৰ লগতে সংলগ্ন হৈ আছিল। সেই সম  
ইংলেণ্ডত কোনো কোনো চহকীলোকে তেওঁলোকৰ মৃত্যুৰ পাছত আত্মাৰ সদগ  
বাবে দৈনিক প্ৰাৰ্থনা গাবলৈ একোজনকৈ যাজকৰ নিযুক্তি কৰি ভৰণ-ভোষণৰ উদ্দে  
যথেষ্ট পৰিমাণত অৰ্থ গীৰ্জাত দান কৰি গৈছিল আৰু এই যাজকসকলেই তেওঁল  
৩৮ || Education in World Perspective

# শব্দের আলিম্পন

সম্পাদনা

হিমবন্তু সাহা  
অভিজিৎ সাহা  
সুশান্ত কৰ্মকাৰ



# শব্দের আলিম্পান

সম্পাদনা

হিমবন্ত সাহা

অভিজিৎ সাহা

সুশান্ত কর্মকার





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## **LITERARY RESONANCE**

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# The Poetics of Folklore: An Introduction to Folk Literature

Gaurab Sengupta

[gaurabliterature@gmail.com](mailto:gaurabliterature@gmail.com)

## Abstract:

Folk literature which is also known as 'folklore' or 'oral' literature is deciphered as the literature of people and communities having no written language. Taking the shape of myths, legends, fables, folklore has largely passed down by word of mouth through generations. Folklore presents stories which have deep cultural signification and are a mirror to the psyche and social structure of communities from which they emerge. Folklores are present in our daily lives. Consciously and unconsciously they form a greater part of our life experience. It is present everywhere, be it jokes or riddles, dance or song, rituals or festivals. There are certain linguistic, social, physical and cultural symbols that are common to people of a particular community. Folklores in this manner bind a community to a particular whole. It gives a distinct characteristic to communities based on certain practices. This paper is a skeletal overview of folklore—its meaning and characteristics. Touching upon various dynamics of folk—from societal, to cultural to economic, this paper looks into the various aspects and lens through which the study of folk can be conducted.

**Keywords:** community, culture, economy, fable, folk, folklore, society

## I

Folklores are present in our daily lives. Consciously and unconsciously they form a greater part of our life experience. It is pre-

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**Editors**

Mr. Gaurab Sengupta  
Dr. Ambalika Borthakur

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# Impact of Cultural Globalization on Indian Society: Merits & Demerits

Dr. Rita Saikia

## Introduction:

Globalization is the process of international integration arising from the interchange of world views, products, ideas and other aspect of culture. The concept of globalization has got inextricably linked with process of transformation touching upon every aspect of social, political and economic development around the globe. It can be seen a process by which the population of the world is increasingly bonded into a single society. The term "Globalization" was first used in french literature on International Relations dating back to the early 1950's. The French term for Globalization is "modernization". This concept usually deals with flows-of-ideas moving from one part of the world to another, capital shunted between two or more places, commodities being trade across borders and people moving in search of better livelihoods to different parts of the world.

The term Globalization is derived from the word "globalize" which refers to the emergence of an international network of economic systems. The term globalization is very wide. It cannot be explained in one sentence. Many scholars have tried to define the concept. In 2000, International Monetary Fund (IMF) identified four basic aspects of globalization that are trade and transactions, capital and investment movements, migration and movement of people and the dissemination of knowledge. Globalization is not a new phenomenon. The central point is that under the forces of Globalization, the greater part of social life is determined by global process in which it seems as if national culture, national economies and national borders are fast integrating under one 'Universal Umbrella'. The term "Globalization" encompasses various aspects included including expanded international trade telecommunications, monetary coordination multinational corporations, cultural exchanges of new types and scales, migration and refugee flows and relations between the world's rich and poor countries. This article is mainly focuses on the cultural aspect of the globalization. It emphasizes how cultural globalization affects our society. It also highlights positive as well as negative impact of cultural globalization.

## Objective of the study:

- To explore the cultural aspect of globalization.

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# ETHNIC LIFE IN NORTH EAST INDIA



Edited by  
**Dr. RABINDRA BORDOLOI**  
**Dr. BORNALI SAIKIA**



## ETHNIC LIFE IN NORTH EAST INDIA

Edited by  
**Dr. Rabindra Bordoloi**  
**Dr. Bornali Saikia**



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# Ethnicity and Development in North East India: Issues and Challenges

Dr. Rita Saikia

## Abstract

Ethnicity is a complex phenomenon in worldwide context. Ethnicity seems a common term relevant in the contemporary world. Ethnicity tends to shared cultural practices, perspectives and distinction that set apart one group of people from another that is ethnicity is a shared cultural heritage. North east India has been occupying a unique position in Indian politics. North East India composed of different ethnicity is plagued with ethnic assertions and regionalism with that of centuries of alienation. This region is home to large number of ethnic groups which came from different direction at different times. Development of the ethnicity is one big issue that needs to be address in the region. After the independence of India, still this region is lagging behind in terms of socio economic, education, political, cultural and social development. Unresolved border dispute, insurgencies and terrorist problems, resources sharing dispute are some common problems which have made this region quite turbulent.

Therefore this paper tries to focus on the issues and challenges which creates hindrances in the development of the Northeastern

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\* Assistant Professor, Dept. of Political Science, Duliajan College, Duliajan



# Ceramic and Specialty Electrolytes for Energy Storage Devices

Volume II

Edited by  
Prasanth Raghavan and Jabeen Fatima M. J.



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# 11 Recent Advances in Non-Platinum-Based Cathode Electrocatalysts for Direct Methanol Fuel Cells

*Bhagyalakhi Baruah and Ashok Kumar*

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## 11.1 INTRODUCTION

Development of alternative energy sources over the traditional ones is an urgent need because of the continuous depletion of fossil fuels. Currently, people have grown interested in fuel-based technologies because of their high efficiency, very low emission and noise, modular design, and low maintenance cost of the fuel cells [1]. Among several fuel-cell-based technologies, direct methanol fuel cells (DMFCs) have been considered a promising energy conversion system because they have high conversion efficiency and are environmentally benign. DMFC is a low temperature (60° C–120° C) proton exchange membrane fuel cell (PEMFC) with high energy

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# 12 Platinum-Free Anode Electrocatalysts for Methanol Oxidation in Direct Methanol Fuel Cells

*Bhagyalakshi Baruah and Ashok Kumar*

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## 12.1 INTRODUCTION

Direct methanol fuel cells (DMFCs) have gained much attention because of their simple structure, environment friendliness, and highly suitable for portable devices, including cellular phones, laptops, notepads, and cameras. DMFCs have been recognized as the future power generation source that can replace the conventional lithium-ion batteries because of their higher energy density (5.04 kWh L<sup>-1</sup>), easy storage ability, transportability, and low cost [1]. It is the modified form of proton exchange membrane fuel cells (PEMFCs), in which polymer electrolyte membranes are used to separate anode and cathode chambers [2]. Unlike PEMFC, methanol can be directly used in DMFC without using reformer subsystems, and the fuel can be stored under atmospheric pressure [3]. However, commercialization of DMFC is still difficult because of the following reasons: methanol crossover across the membrane,

As per the CBCS Syllabus of Dibrugarh University  
(B.A. Sixth Semester Honours and Third Semester Generic Elective)  
and  
Gauhati University  
(B.A. Sixth Semester Honours and Fifth Semester Non-Honours)

# ENVIRONMENTAL ECONOMICS



**Niranjan Das**  
**Karuna Phukan**

**ENVIRONMENTAL ECONOMICS** : A book on economics as per the CBCS syllabus of **Dibrugarh University** (B. A. Sixth Semester Honours and BA Third Semester Generic Elective) and **Gauhati University** (Sixth Semester Honours and Fifth Semester Non-Honours), written by Niranjan Das, Assistant Professor, Duliajan College & Karuna Phukan, Assistant Professor, Digboi College and published by Bidya Bhawan, Jorhat, Assam.

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