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Reflections on Social Work Profession

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S.M. Sajid • Rashmi Jain

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Ideological Agency, Women's Activism and Gender Relations

Macro-micro Integration Approach Analysis

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SINGLEHOOD BY CHOICE
Subculture of Alternative Lifestyle

Dr. Vijender Singh

Department of Sociology,
Kurukshetra University, Kurukshetra.
Haryana-136119
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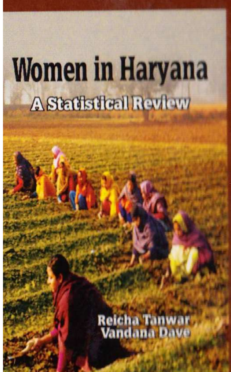
Women in Haryana

A Statistical Review

Reicha Tanwar
Vandana Dave



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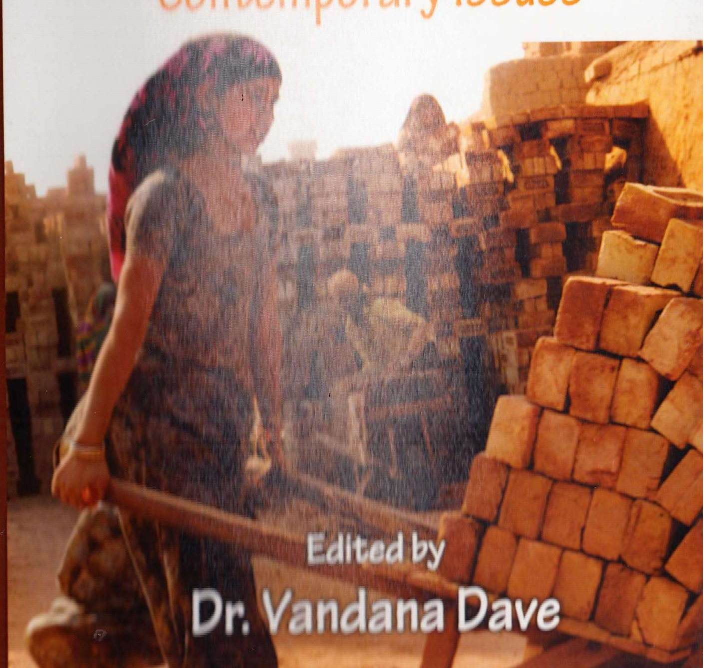

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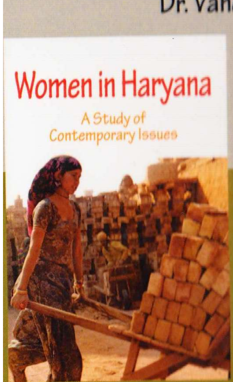

Haryana has made remarkable growth in each and every aspect of the economy but its progress could not be translated into the socio-economic well-being of the women. The reason lies in a culture, which perpetuates discrimination. The book is a compilation of research papers on some historical as well as contemporary issues reflecting various parameters of women's status in Haryana. This volume would enable a comprehensive understanding about the social processes, traditional patriarchal mindset and the values and practices that follow along with the role, identity, contribution and status of women in Haryana.

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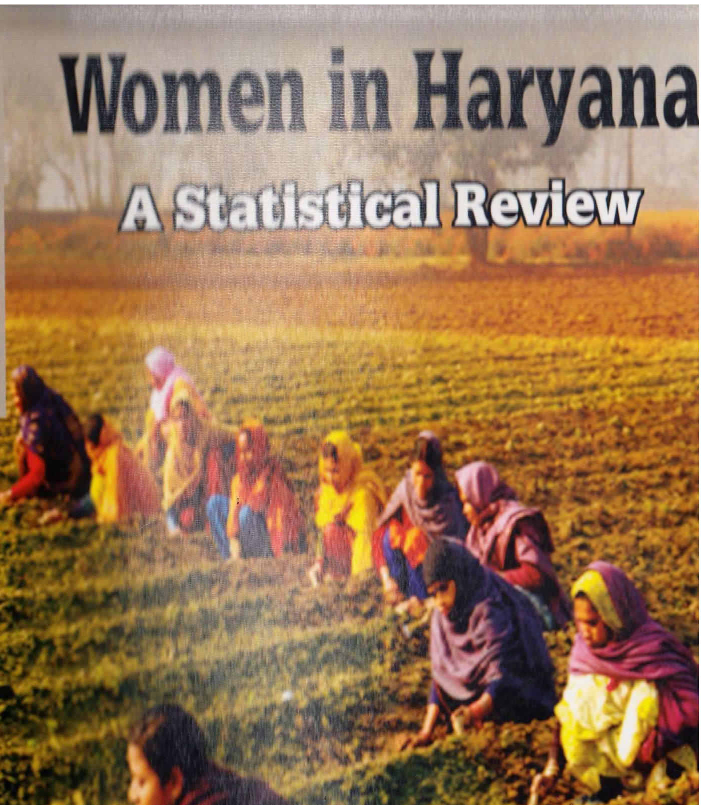

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This book "Emerging Trends and Challenges in Biosciences" provides an excellent, up-to-date discussion of the state of knowledge and fills an important information gap. This book emphasized the significance of modern biological tools and innovations for the development of eco-friendly and sustainable bioprocesses and products. This book will be useful to a wide array of scientists including biologists, academicians and other industrialists to encourage integration of life sciences for better understanding of the complexity and diversity of life processes.

Dr. Raj Pal Singh, Principal, G.M.N. College, Ambala Cantt. has research, teaching and administrative experience of more than 33 years. He has published/edited 18 Books and 38 Research Papers in National/International Journals and proceedings of Seminars/Conferences. He has acted as Resource Person in more than 24 orientation Programmes/Refresher Courses etc. He is member, General Council, NAAC. He has organized more than 20 National Conference/Seminars. This year on 26th Jan, 2018, he has been honored by H.E. Governor of Haryana for excellent services in the field of education.

Dr. Kuldeep Yadav is working as Head, Department of Botany, Gandhi Memorial National College, Ambala Cantt, Haryana. He has done M.Sc., M.Phil. and Ph.D. from Kurukshetra University, Kurukshetra. He has contributed extensively in the field of Plant Biotechnology, Molecular Biology and Mycology. He has published sixty research papers in reputed peer reviewed journals and has also authored six book chapters. He has also edited one book entitled, "Mycorrhizal Fungi".

Dr. Shikha Jaggi is presently working as Head, Department of Zoology at GMN College, Ambala Cantt. She has done his Ph.D. degree in subject of Zoology from Kurukshetra University, Kurukshetra in the field of Human Cytogenetics. She has published eight research papers in reputed journals.

Dr. Meenu Rathi is presently working as Assistant Professor at Gandhi Memorial National College Ambala Cantt. She has done Ph.D. from Choudhary Charan Singh University, Meerut in subject of Botany. She is having 8 years of teaching experience and has published seven research papers and four book chapters.

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Techniques for Remediation of Paper and Pulp Mill Effluents: Processes and Constraints

Smita Chaudhry and Rashmi Paliwal

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Abstract
Economic development of a nation is linked to industrialization, but should not take place at the expense of environmental degradation. The demand for paper and cardboard in packaging industries is continuously on increase. However, paper industry is extremely water intensive and also an obnoxious polluter of the environment, thereby being categorized under the red category of pollution control boards. Pulp and paper mill effluents consist of not only lignin and other naturally occurring polymers but also many xenobiotic compounds (chlorinated lignins, resin acids and phenols, dioxins, furans, chlorophenols, adsorbable organic halogens (AOX), extractable organic halogens (EOXs), polychlorinated biphenyls, polychlorinated dibenzodioxins, plasticizers, etc.),

S. Chaudhry (✉) · R. Paliwal
Institute of Environmental Studies, Kurukshetra University, Kurukshetra, India

C. M. Hussain (ed.), *Handbook of Environmental Materials Management*,
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Bioremediation of Mined Waste Land

Nisha Rani, Hardeep Rai Sharma, Anubha Kaushik, and Anand Sagar

Contents

Abstract

The economic development and ever growing industrialization has improved the GDP and hence standard of living in the entire countries of the world. But all these are accompanied with environmental degradation as a price of

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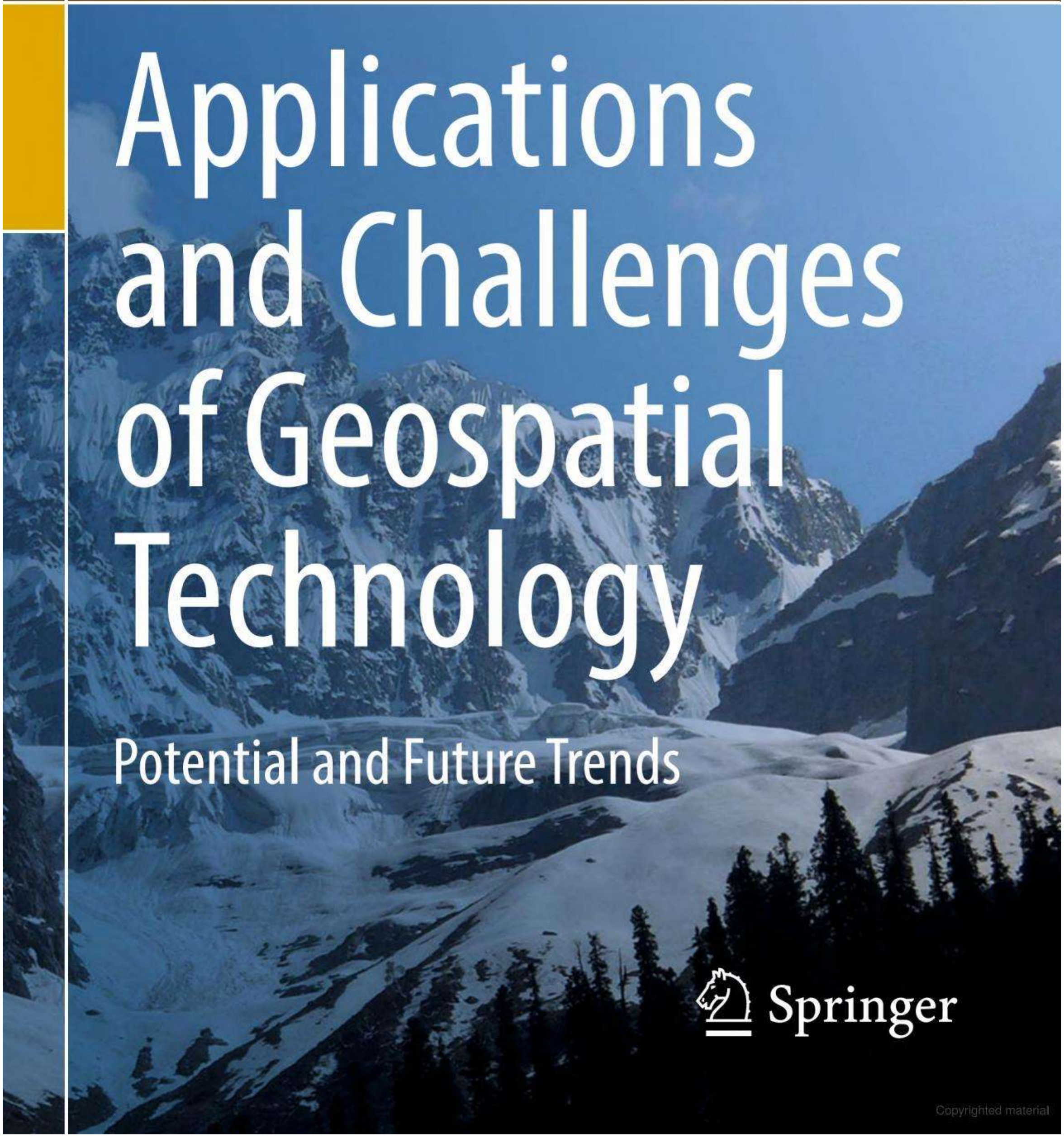

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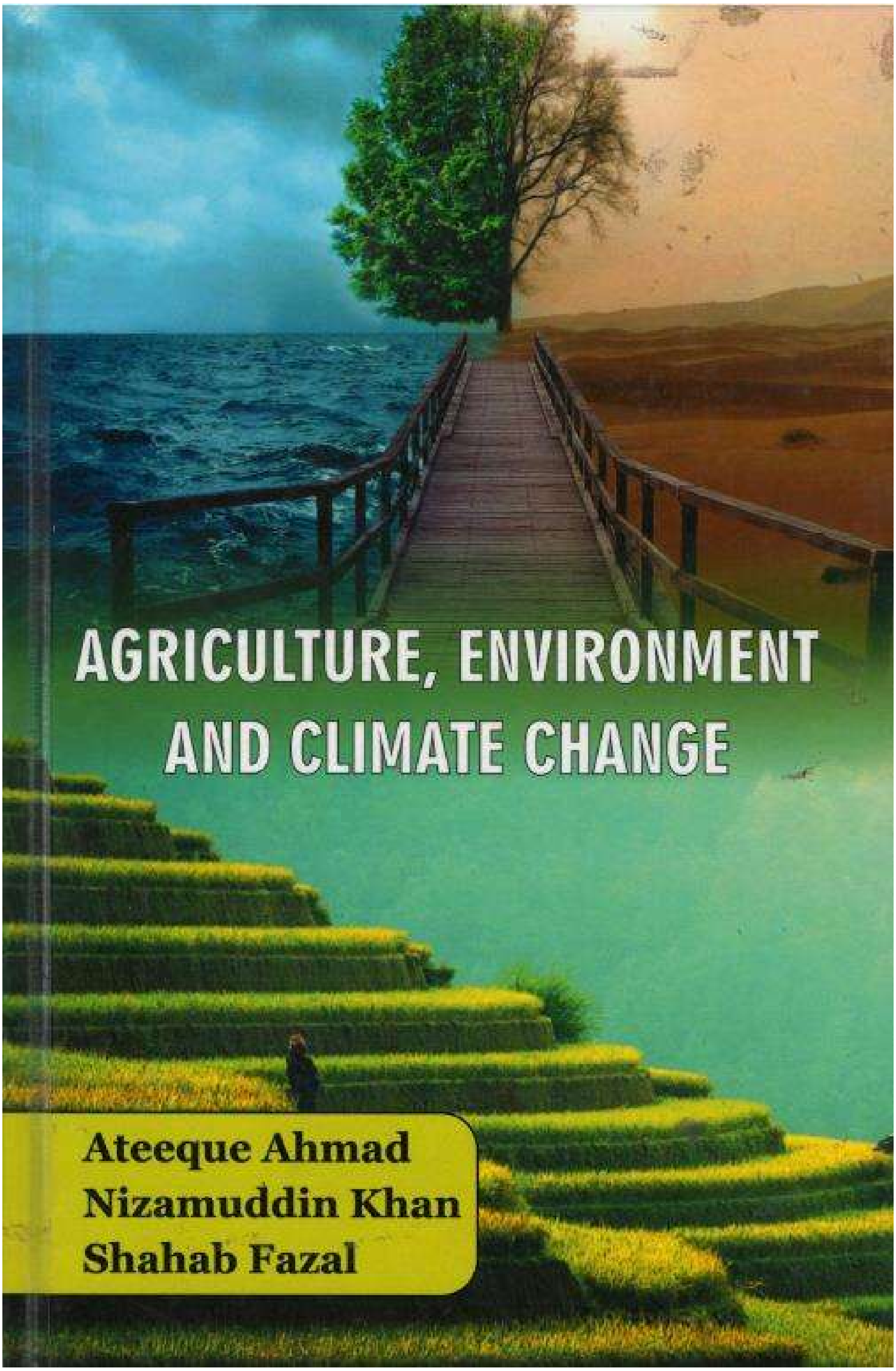
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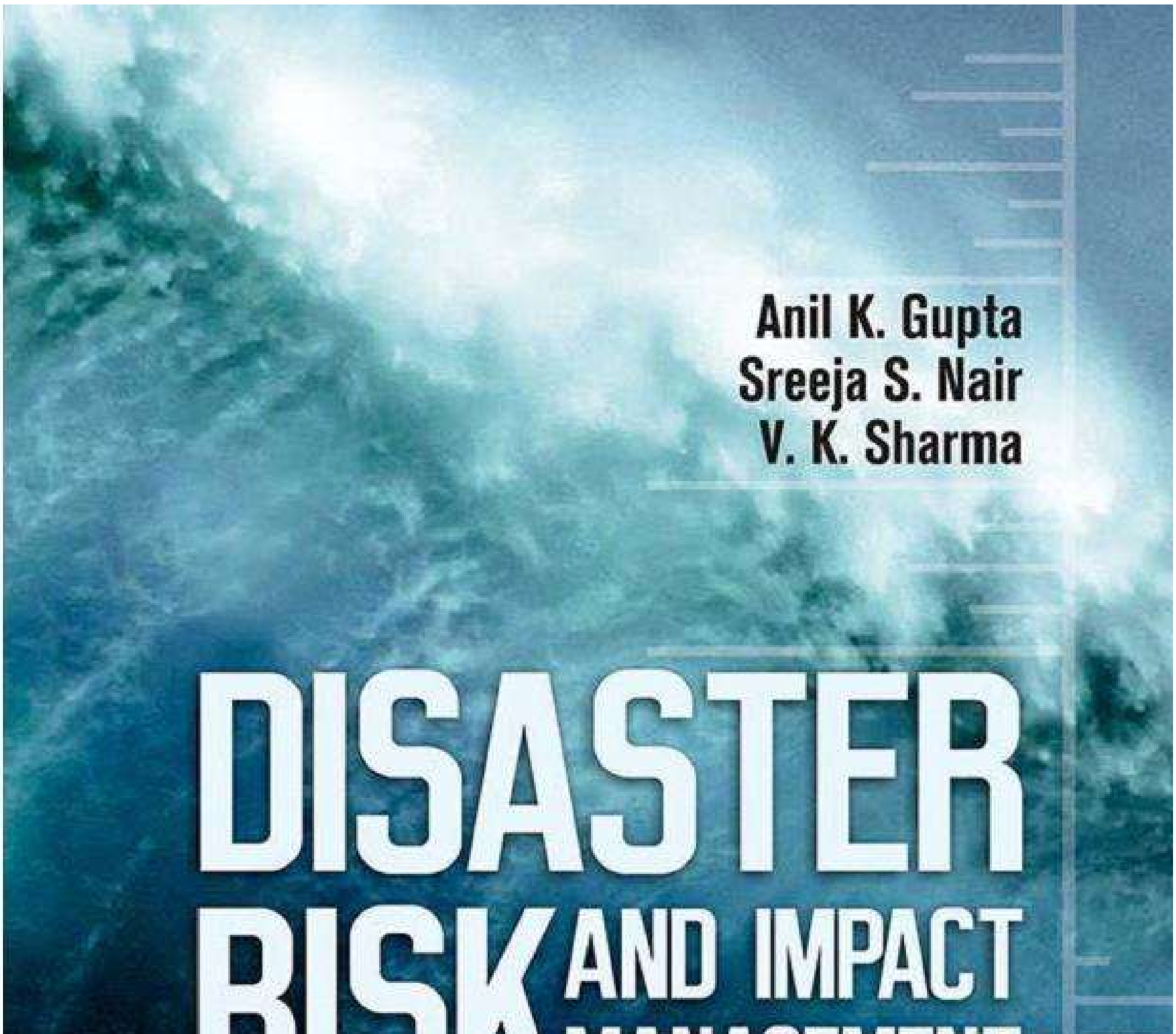
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Akariti Sharma[1,a)], Kulveer Kaur[1], Vinayak Garg[1], *and* R. K. Moudgil[2]

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ABSTRACT

In this paper, we explore the effect of temperature, electron density and

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Coulomb drag in electron-hole bilayer: Mass-asymmetry and exchange correlation effects

AIP Conference Proceedings **1942**, 120014 (2018); https://doi.org/10.1063/1.5029054

Priya Arora[1], Gurvinder Singh[1,2], *and* R. K. Moudgil[1,a)]

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Length-dependent structural stability of linear monatomic Cu wires

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Gurvinder Singh[1,2], Krishan Kumar[2], Baljinder Singh[3], *and* R. K. Moudgil[1,a)]

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ABSTRACT

We present first-principle calculations based on density functional theory for the finite-length monatomic Cu atom linear wires. The structure and its stability with increasing wire length in terms of number of atoms (N) is determined. Interestingly, the bond length is found to exhibit an oscillatory structure (the so-called *magic length* phenomenon), with a qualitative change in oscillatory behavior as one moves from even N wire to odd N wire. The even N wires follow simple even-odd oscillations whereas odd N wires show a phase change at the half length of the wires. The stability of the wire structure, determined in terms of the wire formation energy, also contains even-odd oscillation as a function of wire length. However, the oscillations in formation energy reverse its phase after the wire length is

Mass-gated neutron multiplicity for ^{48}Ti+^{144,154}Sm systems

Ruchi Mahajan[1,*] B.R. Behera[1], Meenu Thakur[1], N. Saneesh[2], Gurpreet Kaur[1], Priya Sharma[1], Kushal Kapoor[1], R. Dubey[2], A. Yadav[2], Neeraj Kumar[3], P. Sugathan[2], A. Jhingan[2], Hardev Singh[4], A. Kumar[1], A. Saxena[5], A. Chatterjee[2], and Santanu Pal[6]
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Introduction

The mass-distribution (MD) and mass-energy distribution (MED) of fission fragments have contribution from fully equilibrated compound nuclear events and non-compound nuclear reactions, such as, quasi-fission (QF), fast-fission and pre-equilibrium fission, etc [1]. These processes have different reaction trajectories while a composite system evolves from the contact point to scission point. This results in different timescales of the fusion-fission and QF processes from the contact point to the scission point [2]. As fusion-fission reactions have longer timescale as compared to QF, there is considerable difference in the neutron multiplicities associated with these processes. Therefore, in order to have more precise picture of fusion-fission and QF processes, neutron multiplicity data has to be analyzed for different mass cuts of the fission fragments. The mass dependence of neutron multiplicities have been recently studied for the system ^{48}Ti+^{208}Pb systems forming ^{256}Rf CN after gating on the different regions (symmetric and asymmetric) of fragment MD and MED [3]. Very recently, the results for average neutron multiplicity have been reported for the ^{48}Ti+^{144,154}Sm [4]. In order to have better insight to the fission dynamics of Po compound nuclei, we have measured mass-gated neutron multiplicity for ^{48}Ti+^{144,154}Sm forming ^{192,202}Po compound nuclei at 72 MeV of excitation energy. This experiment was performed using the National Array of Neutron Detectors (NAND) at Inter University Accelerator Centre (IUAC), New Delhi. For more details on the experimental set up reader is refered to ref [4].

Data Analysis and Results

We have analyzed the neutron energy spectra for different mass cuts for ^{48}Ti+^{144,154}Sm at 260 and 230 MeV respectively as mentioned in Table 1. The, pre- and post-scission components of the neutron multiplicity were derived from the measured neutron energy spectra using multiple source least square fitting procedure based on Watt's expression [4]. The experimentally measured folding angles and the energy per nucleon corresponding to each mass cut are found to be consistent with the Viola systematics and kinematical calculations [5]. Neutron multiplicities corresponding to full array obtained from fitting of the decay of ^{192,202}Po are given in Table 1 and the fitting plots corresponding to symmetric and asymmetric mass region for one of the neutron detectors for ^{48}Ti+^{144}Sm is shown in Fig. 1 a) and b) respectively.

The pre-scission neutrons are experimentally distinguished from post-scission neutrons by measuring the angular correlation between the fission fragment and the emitted neutron. For extracting the neutron-angular correla-

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Statistical model calculations of pre- scission neutron multiplicity and nuclear dissipation for ^{19}F- induced reactions

Rakesh Kumar[1], Kavita[1], Santanu Pal[2], Jhilam Sadhukhan[2], Hardev Singh[1*]
[1]Department of Physics, Kurukshetra University, Kurukshetra, Haryana-136119, INDIA
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Introduction

It is now well established that the pre-scission neutron multiplicity is one of the most efficient probes to study the dynamics of fusion-fission processes [1]. Such measurements are used to distinguish between the fusion-fission and quasi-fission reactions and the amount of dissipation if any, involved in those reactions can also be estimated [2]. In literature, several experimental studies have been done in the area of neutron emission. Several studies have shown that, the projectile-target combination (entrance channel mass asymmetry) plays a very important role in the dynamics of fusion–fission process [1-2].

In the recent work, Meenu Thakur et al. [3], did statistical model calculations for the systems ^{19}F+^{232}Th (α = 0.84) and ^{28}Si+^{232}Th (α = 0.78) at matching excitation energy in the range of 54.6-86.0 MeV. They found that the pre-scission neutron multiplicity decreases with increase in the projectile mass, i.e, going from ^{19}F to ^{28}Si with same target. Basically, in going from ^{19}F+^{232}Th (α = 0.84) to ^{28}Si+^{232}Th (α = 0.78), the entrance channel mass asymmetry decreases. The Authors proposed that the on-set of quasi-fission in ^{28}Si+^{232}Th reaction could be the probable cause for observed decease in pre-scission neutron multiplicity but due to the non-availability of the experimental data for the said system, quasi-fission signature could not be verified experimentally. They proposed to investigate these features in their future experiments. In the current work, we decided to explore the phenomenon of pre-scission neutron multiplicity as a function of entrance channel mass asymmetry at nearly same excitation energies for ^{19}F-induced reactions on various targets. The pre-scission neutron multiplicity for the reaction ^{19}F+^{194}Pt (α = 0.82) has been measured by V. Singh et al. [4], for the reactions ^{19}F+^{181}Ta (α = 0.81) and ^{19}F+^{159}Tb (α = 0.78) by J. O. Newton et al., [5].

Statistical Model Calculations

In the present model, we performed the statistical model calculations for above said reactions over the nearly matching excitation energy range. The pre-scission neutron multiplicities are calculated using the Bohr-Wheelar fission given by the following expression,

$$\Gamma_{BW} = \frac{1}{2\pi\rho_g(E_i)} \int_0^{E_i - V_B} \rho_s(E_i - V_B - \varepsilon)\,d\varepsilon \,,$$

Where, E_i = energy of the initial state, ρ_g = level density at the initial state, ρ_s = level density at saddle point, V_B= the spin dependent fission barrier [6].

In order to incorporate dissipation in fission channel, we used the Kramers fission width as,

$$\Gamma_K = \frac{\hbar\omega_g}{2\pi} e^{-\frac{V_B}{T}} \left\{ \sqrt{1 + \left(\frac{\beta}{2\omega_s}\right)^2} + \left(\frac{\beta}{2\omega_g}\right)^2 \right\},$$

Where, ω_g and ω_s are the frequencies of the harmonic oscillator potential and β is the dissipation strength [7].

Results and Discussion

Statistical model calculations are performed for all the three systems using Bohr-Wheelar fission width as well as Kramers fission width. The Pre-scission neutron multiplicity predicted with Bohr-Wheelar fission width is highly underestimated for all these reactions at all the energies as shown in the figure 1.

Dynamical hindrance effect in fusion for the decay of the compound nucleus ^{64}Zn

H. Arora[1,*], Gulzar Singh[1,*], B. R. Behera[1], Jagdeep Kaur[1], Ajay Tyagi[2], Hardev Singh[3], Rohit Sandal[4], Varinderjit Singh[5], Maninder Kaur[5], Ashok Kumar[1], K.P. Singh[1], K.S. Golda[6], R. P. Singh[6] and S.K. Datta[6]
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Introduction

Light charged particle evaporation spectra from the compound nucleus, populated at moderate excitation energy (~ 100 MeV), allows us to test the application of statistical model for the decay of the compound nucleus. The basic parameters of nuclear properties such as yrast line, level density, emission barriers and angular momentum distribution parameters, are modified by the deformation of highly excited and rapidly rotating nuclei. This leads to dynamical hindrance to fusion. [1, 2]

We present here of analysis for decay of the compound nucleus ^{64}Zn. It was populated at same excitation energy E* ~ 70 MeV, through an asymmetric channel ^{16}O + ^{48}Ti (E_{lab} = 76 MeV) and symmetric channel ^{37}Cl + ^{27}Al (E_{lab} = 125 MeV). The inclusive alpha spectra and neutrons are compared with the predictions of conventional statistical model calculations (CASCADE). The limitations of this description for the case of symmetric reaction are also explained.

Experimental details

The experiment was performed with 15UD Pelletron at IUAC, New Delhi, India using the General Purpose Scattering Chamber (GPSC). A ^{48}Ti foil and an ^{27}Al foil each of about 1.0 mg/cm^2 thickness were used as targets. Light charged particle spectra were recorded using two ΔE-E telescopes. These spectra were taken at 30°, 36°, 42°, 48° and 54° for both the systems. While the neutrons were detected using the liquid scintillator cells of BC501 at laboratory angles θ = 30°, 60°, 90° and 120° with respect to the beam direction. The neutron detectors were placed at a distance of 1 m from the target.

Analysis and Discussions

The experimental analysis was carried out using CANDLE software, and the theoretical results were obtained using the statistical model code CASCADE. In the CASCADE code, the spin dependent energy is parameterized as

Fission time study for the fissioning nuclei ^{212}Rn via neutron multiplicity measurements

K.Kapoor[1], N.Bansal[1], S.Verma[1], K.Rani[1], R.Mahajan[1], Chetan Sharma[1], B.R.Behera[1], K.P.Singh[1], A.Kumar[1],* H.Singh[2], R.Dubey[3], N.Saneesh[3], M.Kumar[3], A.Yadav[3], A.Jhingan[3], P.Sugathan[3], B.K.Nayak[4], A.Saxena[4], H.P.Sharma[5], and S.K.Chamoli[6]
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Introduction

Study of heavy ion-induced fusion-fission process for a number of compound nuclei has been in progress for the number of years. These studies are devoted to understand the role of viscosity in the fission-fusion process. Due to this viscous nature of compound nucleus, the fission process is hindered. The compound nucleus formed as a result of fusion of two nuclei de-excites by emitting number of light particles such as α, p, ν and γ in addition to fission fragments. These particles emitted during de-excitation contains valuable information about the dynamical nature of compound nucleus. The experimentally measured multiplicities are larger than the values predicted by the statistical model of compound nucleus which confirms that the fission process slows down. The measured multiplicities of these particles is used to extract the total fission time. The total fission time is divided into two parts, the transient time(τ_{tr}) which also include the formation time of the compound nucleus and the saddle to scission time(τ_{ssc}).

In the present work, pre and post-scission alpha and neutron multiplicities have been simultaneously measured for the compound nucleus ^{212}Rn and fission time is extracted using the statistical model code Joanne-2 [1].

Experimental Details

The experiment was performed in the General Purpose Scattering Chamber(GPSC) facility at IUAC, New Delhi. Pulsed beam of ^{16}O from 15UD Pelletron has been bombarded on self-supporting enriched target of ^{196}Pt at energy 93 forming the compound nucleus ^{212}Rn at excitation energy of 56 MeV. The target used was of thickness of 1.8 mg/cm^2 and was placed at an angle of 45^0 with respect to the beam. Two Multi Wire Proportional Counters (MWPC) were placed at the folding angles of 30^0 and 135^0 for detecting fission fragments. Both were placed at a distance of 20.5 cm from the center of target and have an active area of 20cm × 10cm. In order to separate the fission events from other competing processes, time-of-flight (TOF) information of fission fragments from MWPCs was used. Two Monitor Detectors, passivated implanted planar silicon (PIPS), were also place inside the scattering chamber at $\pm 10^0$.

Neutrons were detected using three liquid organic scintillator detectors (BC501) coupled to 12.7cm XP4512B Photomultiplier tube. These detectors were placed outside the scattering chamber at angles of 30^0, 90^0 and 120^0 w.r.t beam direction at distance of 1.5m. In addition to it, four CsI(Ti) detectors were also used at angles of 70^0, 90^0, 110^0 and

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Effect of embedded silver nanoparticles on refractive index of soda lime glass

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Comparative Study of Properties of Stable (^{4}He) and Weakly Bound (^{6}He, ^{8}He) Helium Isotopes using Skyrme Pairing Force-SKP and Modified SKM* Functionals

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In last few decades, the ground state properties of nuclei have been studied within the self-consistent mean-field approximation. Such a description of the atomic nucleus has ability to properly account for the bulk properties of nuclei such as masses, energies, radii or shape. The Hartree-Fock method provides a good approximation of closed shell magic nuclei, however, the pairing correlations constitute an essential ingredient for the description of open shell nuclei. These effects are usually described by the Hartree-Fock plus BCS (HFBCS) or Hartree-Fock-Bogolyubov (HFB) methods [1-4]. The HFB problem in coordinate basis, along with the use of the effective Skyrme force is indeed a powerful tool for studying ground-state properties of nuclei.

Another microscopic approach that is well suited in providing quantified predictions throughout the nuclear chart is nuclear Density Functional Theory (DFT) [5-7]. In Density Functional Theory (DFT), the basic idea is that the ground-state energy of a stationary many-body system can be represented in terms of the ground state density alone. Since the density is only a function with three spatial coordinates, DFT calculations are comparatively simple to implement and often very accurate and computationally feasible even for systems with large particle numbers.

An effective interaction in DFT is given by the energy density functional (EDF), whose coupling constants are adjusted to reproduce measured observables. In particular, the Hartree-Fock method with Skyrme interaction becomes the most widely utilized approach to analyse the nuclear structure and related properties.

In its original form Skyrme's interaction can be written as a potential [2].

$$V = \sum_{i<j} v_{ij}^{(2)} + \sum_{i<j<k} v_{ijk}^{(3)}$$

with, $v_{ij}^{(2)}$ is a two body term and $v_{ijk}^{(3)}$ is a three body term. The two body term and three body term were modified by different authors by fitting the large set of experimental data available in literature [2-5].

. In this approach, the total Hamiltonian H_T can be expressed as the integral of the density functional [1-4] as given below.

$$H_T = \langle \Psi | H | \Psi \rangle = \int H d^3 r$$

with,

$$H = H_{kin} + H_0 + H_{density} + H_{eff} + H_{fin} + H_{so} + H_{sg} + H_{Coul}$$

and various terms have their usual meanings. Besides these, pairing correlations have been known to influence nuclear structure and reaction dynamics of spherical and deformed nuclei and hence must be entertained in the theoretical description. Gogny and his collaborators [8] within the framework of Hatree-Fock Bogolyubov (HFB) theory developed an effective interaction appropriate for description of the mean field and pairing correlations. The Hartree-Fock method with effective Skyrme interaction, wherein one can work in coordinate space and properly handle the particle continuum states in nuclei close to drip lines, is another simple alternative way to include the pairing effects.

Sensitivity on potential parameters of fusion reaction cross section around Coulomb barrier

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Introduction

During last few decades, the fusion dynamics of weakly bound nuclei has been investigated comprehensively with the advancement in radioactive ion beam facilities [1]. The fusion reactions involving these nuclei dominantly affected by, the diffused density distribution and low breakup threshold. The key ingredient required in fusion reactions is the interaction potential and understanding of which remains one of the major subject in nuclear physics research. However, the phenomenological Woods-Saxon potential has been used frequently to interpret the experimental results obtained through fusion reactions induced by weakly and tightly bound projectiles. Nevertheless, it is not free from the ambiguities of magnitude of potential parameters which needs proper tuning.

Therefore it is worth to investigate the sensitivity of geometrical parameters like radii and diffuseness of considered potential form while analyzing the fusion reaction data. Here, in this conference contribution we focused on the analysis of ^{6}He+^{209}Bi fusion reaction in the vicinity of Coulomb barrier, through Kemble version of WKB approximation and Hill-Wheeler formula, with a particular emphasis to understand the sensitivity of fusion cross section on radius diffuseness, curvature as well as on the number of partial waves.

Theoretical formalism

The total interaction potential between the colliding pair may be written as,

$$V_l(r) = V_N + V_C + V_{Ce}$$

here V_N, V_C and V_{Ce} represent nuclear, Coulomb and centrifugal parts of potential respectively. The Woods-Saxon form is used to represent the nuclear part of total interaction potential and expressed as

$$V_N(r) = \frac{V_0^N}{1+\exp\left[\frac{(r-R)}{a}\right]}$$

V_0^N , R and a gives potential depth, range and diffuseness parameters respectively. Further the depth (V_0^N) and range (R) are parameterized as

$$V_0^N = -40 \times \frac{R_P R_T}{R_P+R_T} \qquad (1)$$

with $$R_{P(T)} = r_0(A_{P(T)})^{1/3} - 0.77(A_{P(T)})^{-1/3} \qquad (2)$$

and $$R = r_0(A_P^{1/3} + A_T^{1/3}) \qquad (3)$$

here R_P, R_T and A_P, A_T denote the size and mass numbers of projectile and target respectively. Now the fusion reaction cross section summed over partial waves can be evaluated through following expression [2]

$$\sigma_f = \frac{\Pi}{k^2}\sum_{l=0}^{\infty}(2l+1)T_l^f \qquad (4)$$

For projectiles with energy less than barrier height the transmission coefficient (T_l^f) for l-th partial wave is estimated through Kemble version of WKB approximation [3] which is written as

$$T_l^f = \frac{1}{1+\exp(2\,\mathrm{Im}(\int_{r_{in}}^{r_{out}} K_l(r)dr))}$$

here r_{in} and r_{out} gives the inner and outer classical turning points of the potential $V_l(r)$ and are calculated with condition $V_l(r_{(in/out)}) = E$. The wave number ($K_l(r)$) is given by

$$K_l(r) = \frac{1}{\hbar}\sqrt{2\mu(E - V_l(r))}$$

While for projectile having energies above the barrier the analytical form of transmission coefficient for l-th partial wave has been expressed by Hill-Wheeler formula as [4]

$$T_l^f(E_{c.m.}) = \left(1 + \exp\left(\frac{2\Pi}{\hbar\omega}(V_{Bl} - E_{c.m.})\right)\right)^{-1}$$

here V_{Bl} represents barrier height for l-th partial wave while $\hbar\omega$ gives the corresponding curvature of the inverted parabola.

Results and Conclusions

In present contribution we have analyzed the degree of sensitivity of different geometrical components of total interaction potential on potential barrier and fusion reaction cross section for ^{6}He+^{209}Bi system in the

Glauber Model Analysis of Reaction Cross Section for $^{19}C+^{12}C$ System in the Energy Range 300-700 MeV/A

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The availability of radioactive ion beams has made it possible to investigate the properties of nuclei lying in the close proximity of neutron and proton drip lines. The pioneering experiments performed by I. Tanihata and collaborators using beams of highly neutron rich nuclei have confirmed the existence of a novel halo structure among some of these isotopes [1]. Subsequently many more neutron and proton halo nuclei have been identified through experiments measuring the reaction cross sections or breakup cross sections differential in longitudinal component of momentum of the fragments produced in the breakup process. Since more than one carbon isotopes have been found to have neutron halo structure, the carbon isotopic chain has attracted special attention. Very recently reaction cross section of ^{19}C on ^{12}C target has been measured at an energy 307 MeV/A [2]. Since reaction cross section is a very sensitive probe in determining the size and hence in deciding the halo character of a nuclear isotope, here we have analyzed it through Glauber model by employing two different single particle wave functions. Within the Glauber model, the projectile target total reaction cross section is given by [3]

$$\sigma_R = \int db\,(1 - |< \varphi_0| e^{i\chi_{CT}(b_c) + i\chi_{NT}(b_c+s)} |\varphi_0 >|^2)$$

where all the symbols have their usual meanings as given in Ref. [3]. It is pertinent to mention here that the projectile is assumed to has a core plus one nucleon structure. The core-target and nucleon-target phase shifts that is χ_{CT} and χ_{NT} need the profile functions and nuclear densities for their determination. The profile function is usually parametrized as [3]

$$\Gamma(\boldsymbol{b}) = \frac{1-i\alpha}{4\pi\beta}\sigma_{NN}e^{-b^2/2\beta}$$

The values of parameters σ_{NN}, cross section for nucleon-nucleon collision, and α, the ratio of real to imaginary part of nucleon-nucleon scattering amplitudes, are obtained by using the recent prescription of Ref. [4]. While those of β, slope parameter of the nucleon-nucleon elastic differential cross section, are taken as an appropriate average of the values quoted in Ref. [5]. The core and target densities are considered to be described by sum of two Gaussians with four free parameters. The parameters of density distributions are determined to fulfill the following four conditions. (i) The density at the center of the nucleus is constant with a value of 0.1382 fm^{-3}. (ii) The integration of the density is normalized to the total number of nucleons. (iii) The integration of density multiplied by r^2 is normalized to mean square radius of the nucleus and (iv) at a distance of 1.07 $A^{1/3}$ fm from the center the density becomes half of that at center. Another key factor in the determination of reaction cross section is the ground state single particle wave function of the projectile which is obtained by solving the following radial Schrodinger equation

$$\frac{d^2R(r)}{dr^2} + \frac{2\mu}{\hbar^2}\left[E - U(r) - \frac{l(l+1)\hbar^2}{2\mu r^2}\right]R(r) = 0.$$

The potential U(r) consists of nuclear, spin-orbit and Coulomb parts and is written as

$$U(r) = -V_0 f(r) + V_{ls}(\boldsymbol{l}.\boldsymbol{s})r_0^2\frac{1}{r}\frac{d}{dr}f(r) + V_{Coul}.$$

In the present work two different kinds of approaches are adopted for nuclear and spin-orbit parts of the potential while the Coulomb part is zero for $n+^{18}C$ system. One of the most frequently used potential is the usual Woods-Saxon (WS) potential with the following form factor

$$f(r) = \left[1 + \exp\left(\frac{r-R}{a}\right)\right]^{-1}$$

The parameters a and R are fixed at 0.6 fm and $1.2 \times A_C^{1/3}$fm respectively while the depth of the

Study of Decay properties of $^{269-271}$Hs* nucleus formed via Different incoming Channels by using SIII Skyrme Force

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Introduction

The production of superheavy nuclei is only possible due to the quantum shell effect that overcomes the strong Coulomb repulsion between the large numbers of protons and stabilized them against spontaneous fission. The method being used successfully for the synthesis of superheavy elements is that of complete fusion reactions, which are classified as Pb- or Bi-based cold fusion and ^{48}Ca based hot fusion reactions. In the present work, we extend our earlier [1] study of the excitation functions (EFs) of ^{274}Hs*, formed in hot fusion ($E^*> 25$MeV) reactions ^{26}Mg+^{248}Cm [2], ^{48}Ca+^{226}Ra [3] and ^{36}S+^{238}U [4], based on Dynamical Cluster-decay Model (DCM) [5], to the use of other nuclear interaction potential derived from Skyrme energy density formalism (SEDF) based on semiclassical extended Thomas Fermi (ETF) approach. The Skyrme force used is the old SIII force [6] for our calculation for cross section and compared with experimental data taken from [2–4]. Here, only the EFs for the production of $^{269-271}$Hs isotope via 3n-5n decay channel from the ^{274}Hs* compound nucleus are studied at $E^* = 40$ to 51 MeV for three incoming channel, including quadrupole deformations β_{2i} and "hot-optimum" orientations θ_i. The calculations are made within the DCM where the neck-length ΔR is the only parameter representing the relative separation distance between two fragments and/or clusters A_i(i=1,2) which assimilates the neck formation effects.

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Methodology

The nucleus-nucleus interaction potential in SEDF, based on ETF method, is defined as

$$V_N(R) = E(R) - E(\infty) = \int H(\vec{r})d\vec{r} - \left[\int H_1(\vec{r})d\vec{r} + \int H_2(\vec{r})d\vec{r}\right] \quad (1)$$

where H is the Skyrme Hamiltonian density, a function of nucler, kinetic-energy, and spin-orbit densities, the later two themselves being the functions of the nucleon/ nuclear density, written in terms of, so-called, the Skyrme force parameters, obtained by fitting to ground-state properties of various nuclei. There are many such forces, both old and new, and we have chosen new SIII Skyrme [6] force for our calculation. The radius vectors for axially symmetric deformed nuclei are

$$R_i(\alpha_i, T) = R_{0i}(T)\left[1 + \sum_{\lambda} \beta_{\lambda i} Y_{\lambda}^{(0)}(\alpha_i)\right], \quad (2)$$

with T-dependent equivalent spherical nuclear radii $R_{0i}(T) = R_{0i}(T = 0)(1 + 0.0007T^2)$ [7] for the nuclear proximity pocket formula, and $R_{0i}(T) = R_{0i}(T = 0)(1 + 0.0005T^2)$ [8] for SEDF, where $R_{0i}(T = 0) = [1.28A_i^{1/3} - 0.76 + 0.8A_i^{-1/3}]$.

Finally, the compound nucleus temperature T (in MeV) is given by

$$E^* = E_{c.m.} + Q_{in} = (A/10)\,T^2 - T. \quad (3)$$

Adding to V_N, the Coulomb and angular momentum ℓ-dependent potentials V_C and V_ℓ, we get the total interaction potential $V(R, \ell)$, characterized by barrier height V_B^ℓ, position R_B^ℓ and curvatur $\hbar\omega_\ell$, each being ℓ-dependent.

Sensitivity of survival probability of projectile on matter density distribution

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The survival probability ($|S(b)|^2$) of a projectile, as a function of impact parameter b, has been playing the central role in nuclear reaction studies [1-6]. The evaluation of $|S(b)|^2$ is carried out in terms of integral of the projectile (P)-target (T) interaction potential V_{PT} along the straight-line trajectories and is given by [7]

$$S(b) = exp\left[\frac{i}{\hbar v}\int V_{PT}(b^2+z^2)dz\right] \quad (1)$$

The nucleus-nucleus potential V_{PT} plays a key role in the evaluation of S-matrix. Out of several available approaches to construct V_{PT}, the commonly used is the double folding one in which the nucleon-nucleon interaction (v_{nn}) is doubly folded over nuclear matter densities of the colliding nuclei. The double folding potential V_{PT} is given by [8, 9]

$$V_{PT}(r) = \int \rho_1(r_1) v_{nn} \rho_2(r_2) dr_1 dr_2 \quad (2)$$

here, $\rho_1(r_1)$ and $\rho_2(r_2)$ are the matter density of the colliding nuclei. There exists several forms of matter density distributions and out of these, the Fermi type form is one of the most commonly used which may further be subdivided in two types-two parameter Fermi (2pF) and three parameter Fermi (3pF) density distribution. It is obvious from the above mentioned expressions, eqns. (1) and (2), that the value of V_{PT} and hence $|S(b)|^2$ depend on the matter density distribution. It is therefore, interesting to check the relative effect of 2pF and 3pF matter density distributions on the evaluation of $|S(b)|^2$.

In present work, the value of $|S(b)|^2$ is evaluated for a number of projectile target systems varying from $^{28}Si+^{208}Pb$ to $^{76}Ge+^{208}Pb$ at intermediate incident beam energies ranging from 30 MeV/A to 300 MeV/A. The matter density distributions used for various projectiles are of the 2pF and 3pF type and for target we have used the liquid drop density distribution. The 2pF density distribution is given by [10-12]

$$\rho(r) = \frac{\rho_0}{\left(1+\exp(\frac{r-R}{a})\right)} \quad (3)$$

where, ρ_0, R and a are the central density, radius and surface (diffuseness) parameter respectively.

The 3pF density distribution is given by [12, 13]

$$\rho(r) = \frac{\rho_0\left(1+\frac{wr^2}{R^2}\right)}{\left(1+\exp(\frac{r-R}{a})\right)} \quad (4)$$

here, the parameter w represents the inner depth, depression or wine-bottle parameter. It is the parameter w which differentiates the 2pF and 3pF density distributions. The 3pF density distribution, eqn. (3) reduces to 2pF, eqn. (2) in case the parameter w equals to zero. The value of central density ρ_0 is determined by the following normalization condition

$$\int \rho(r)dr = A \quad (5)$$

here, A is mass number of the nucleus.

The plot of 2pF and 3pF matter density distribution for ^{48}Ca is given in fig. 1.

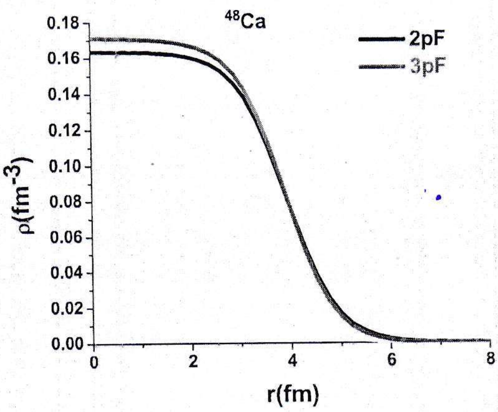

Fig. 1 (Color online) The 2pF and 3pF matter density distribution for ^{28}Si and ^{48}Ca isotopes.

It is clear from fig. 1 that difference in the value of density for 2pF and 3pF distributions is obvious for the central region and it continues towards surface region up to a definite value of $r \sim 3fm$. Near surface region the value of density is same for both forms of density distributions.

Study of (^{3}He, t) charge exchange reaction on Zr and Mg targets through distorted wave impulse approximation

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The advancement in experimental facilities across the globe has created a renewed interest in the study of charge exchange reactions of type (p, n)/(^{3}He, t) and (n, p)/(t, ^{3}He) on targets having wide range of Z number[1, 2]. These reactions serve as an effective tool to excite the isobaric analog state (IAS) of target through Fermi transitions (ΔL = ΔS = 0 and ΔT=1). IAS is the state with same structure as that of target except for the replacement of a neutron with a proton in residual nucleus.

Especially, in the limit of vanishing momentum transfer the Fermi transition strength may be linked with the weak nuclear transition strength. The strengths deduced through charge exchange reactions serve as inputs to the modeling of the explosion dynamics of a massive star [3].

In the past variety of codes based on different approaches have been developed to analyze the data obtained by charge exchange reactions [4, 5]. However, in these codes the knock-on exchange contribution is either completely ignored or is approximately considered. Thus here we present the results of (^{3}He, t) charge exchange reaction on ^{90}Zr and ^{26}Mg targets at 140AMeV energy obtained using the newly developed DCP-2 code (based on earlier version DCP-1[5]) developed by employing distorted wave impulse (DWI) approximation.

In this approach the differential cross section for A(a, b)B charge exchange reaction may be expressed as [6]

$$\frac{d\sigma}{d\Omega}=\frac{\mu_a\mu_b}{(2\pi\hbar^2)^2}\frac{k_b}{k_a}\left|\sum_{i=D,E}\sum_{k,l_1t_1}\alpha^{t_1s_1l_1kl_t}_{j_ts_tv_1}\,T^i_{t_1s_1l_1kl_tm_{l_t}}\right|^2$$

Now The transition amplitude, T^i ,may be written in terms of direct and exchange overlap integrals as

$$T^i_{t_1s_1l_1kl_tm_{l_t}}=\frac{(4\pi)^{3/2}}{k_a k_b}\sum_{l_al_b}i^{l_a-l_b+\pi}\,\hat{l}_a\,(l_a0l_t\,m_{l_t}|l_bm_{l_t})\,O^i_{t_1s_1l_1kl_t,l_al_b}\,Y_{l_bm_{l_t}}(\hat{k}_b)$$

Here O^i represent the direct (i = D) and exchange (i = E) overlap integrals and are given as

$$O^D_{t_1s_1l_1kl_t,l_al_b}=\frac{1}{4\pi}\hat{l}_a\hat{l}_t\hat{l}_b^{-1}(l_a0l_t0)\int dr_a\,\chi_{l_b}(r_a)\,f^D_{t_1s_1l_1kl_t}\,\chi_{l_a}(r_a)$$

and

$$O^E_{t_1s_1l_1kl_t,l_al_b}=J\int dr_b\int dr_a\,r_br_a\,\chi_{l_b}(r_a)\,f^E_{t_1s_1l_1kl_t,l_al_b}(r_b,r_a)\,\chi_{l_a}(r_a)$$

respectively. Further the direct (f^D) and exchange (f^E) form factors may be expressed as

$$f^D_{t_1s_1l_1kl_t}(r_a)=\iota^{-\pi}(-)^{l_1}\hat{l}_t^{-1}\int r^2dr\,V^D_{t_1s_1k}(r)\int r_2^2dr_1\,\rho^D_{P,kl_tl_1}(r_a,r_1,r)\,\rho^D_{T,l_1}(r_1)$$

and

$$f^{E,PW}_{t_1s_1l_1kl_t}(r_b)=\sqrt{4\pi}\sum_{l\lambda l_r}\iota^{-\pi-l_r-l}\hat{k}\hat{\lambda}(k0\lambda0|l_r0)\hat{l}_1\hat{l}_rW(l\lambda l_tk:l_1l_r)$$
$$\times(-)^{k+l_1-l_t}(lm_{l_t}l_r0|l_tm_{l_t})\int dr\,r^{k+2}\,G^k_{1t_1s_1l_1l\lambda}(r_b,r)\,j_{l_r}(\alpha k_ar/a)$$

respectively.

The variables appeared in above Eqs. are having same meaning as in ref. [6].

Results and Discussion

This conference contribution focused on the study of Fermi transitions ((ΔL = ΔS = 0 and ΔT=1 in the limit of vanishing momentum transfer) for which proportionality relation between the differential cross section and the corresponding transition strength exists and reproduced below as [7]:

$$\frac{d\sigma}{d\Omega}(q=0)=\hat{\sigma}_F\,B(F)$$

The specific objective is, to investigate the significance of inclusion of exactly calculated knock-on exchange amplitude while analyzing the differential cross section for the ^{90}Zr(0$^+$, gs)(^{3}He, t)^{90}Nb(0$^+$, 5.01) and ^{26}Mg(0$^+$, gs)(^{3}He, t)^{26}Ar(0$^+$, 0.228) charge exchange reactions. The results of present work are presented in figures 1 and 2 and it is

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Analysis of Angular Distribution Data for $^{9,10,11}Be + ^{64}Zn$ Systems at Slightly Above Barrier Energy

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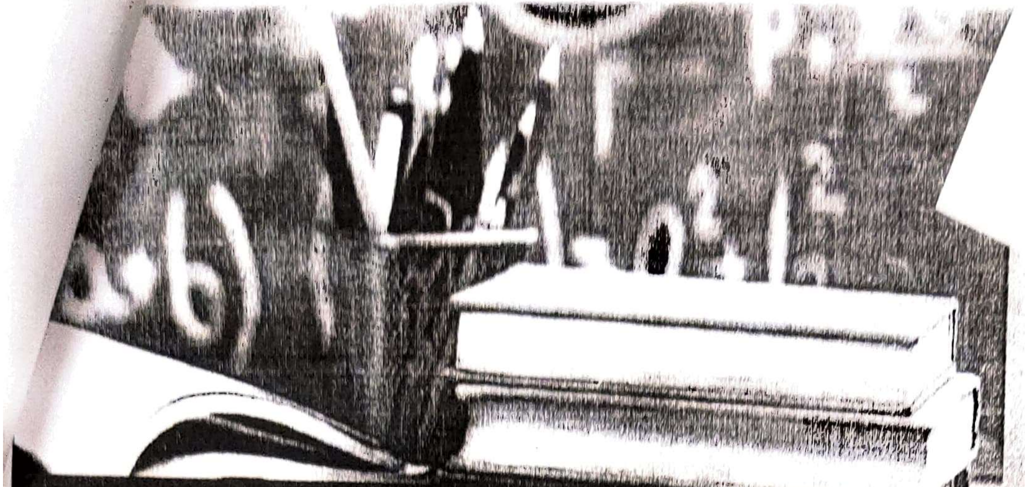
Heavy ion elastic scattering angular distributions, when plotted as a ratio of Rutherford scattering cross section, typically have a characteristic form referred to as Fresnel scattering pattern i.e. one or more oscillations about the Rutherford value at small angles followed by a larger peak before an exponential fall off as a function of scattering angle. The large peak is because of interference between the Coulomb and nuclear amplitudes, called Coulomb nuclear interference peak or the Coulomb rainbow peak [1]. Elastic scattering is considered as a simple and peripheral process which can be easily explained by the models wherein internal structure of the interacting nuclei is generally ignored. However, because of the unique characteristics properties of halo nuclei it becomes essential to investigate the role of these properties in the analysis of quasielastic scattering angular distributions. In particular, the low breakup threshold compels to include coupling to breakup channels in the analysis [2]. In order to see these effects conspicuously, it is quite tempting to compare the quasielastic angular distributions of well established halo nucleus with those of other nuclei in a particular isotopic chain. The nucleus ^{11}Be is a prototype one neutron halo nucleus having a ^{10}Be core surrounded by one valance neutron with a binding energy of just 503keV [3]. Thus, in the present work we have analyzed elastic scattering angular distribution for $^{9,10}Be + ^{64}Zn$ systems and quasielastic angular distribution for $^{11}Be+^{64}Zn$ system at energy about 1.4 times the Coulomb barrier using the FRESCO code.

The code FRESCO is a general purpose code to analyze various nuclear reactions and is based on coupled channel approach. In case of a loosely bound halo system either there is no bound excited state or at the most there exists one such state. Consequently, in order to take into account the effect of coupling to inelastic channel it is essential to take coupling with states in energy continuum. The coupling to continuum is made quite simplified in an approach called continuum discretized coupled channel (CDCC) method which is an important component of FRESCO code.

In CDCC calculations, the projectile ^{11}Be is treated as a two body system consisting of ^{10}Be core and a valance neutron whereas the target is a nucleus with normal nuclear density that is $^{11}Be+^{64}Zn$ is effectively a three body system [4]. The continuum is discretized by putting an upper limit of excitation energy and then dividing it in to energy intervals called bins [5]. The three body wave function (two body projectile + target) is obtained by solving a set of coupled differential equations numerically under appropriate boundary conditions.

The potential parameters needed in the calculations for $^{9}Be+^{64}Zn$ and ^{10}Be-^{64}Zn systems are taken from Ref. [3]. While in case of $^{11}Be+^{64}Zn$ in which the effects of breakup channels are included the potential parameters are taken from Refs. [3, 6]. The ground state wave function of ^{11}Be is generated by employing the interaction potential given in Ref [7]. The results of the calculations along with the experimental data taken from Ref. [4] are presented in Fig.1.

It can be clearly seen from Fig.1 that the elastic scattering angular distributions for ^{9}Be and ^{10}Be isotopes are similar to each other and resemble very well with the standard one. But the angular distribution of halo nucleus ^{11}Be shows extremely strange features and differs drastically from the standard angular distribution shape. In this case the Coulomb nuclear interference peak has disappeared and a dramatic reduction of elastic cross section is observed at



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AN ANTHOLOGY FOR RESEARCHERS AND PRACTITIONERS

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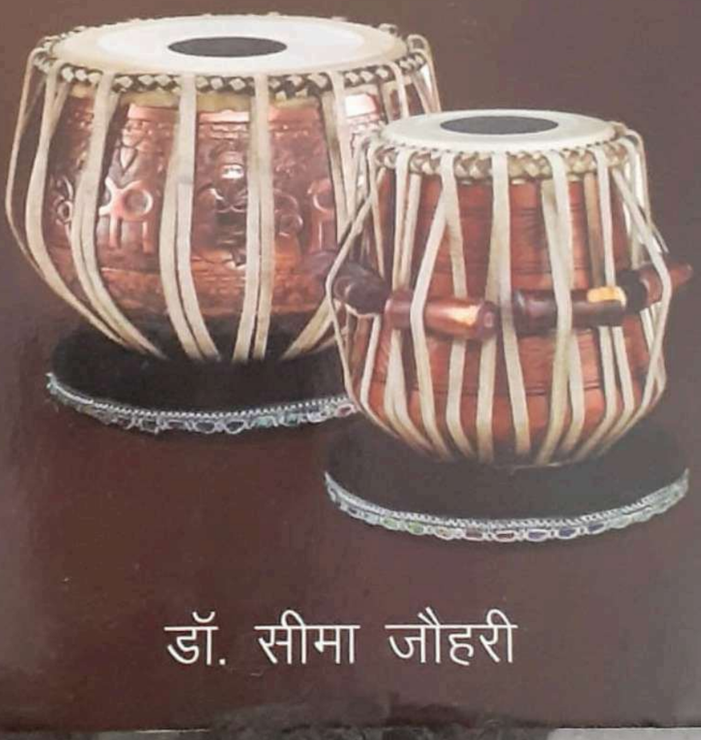
संगीत वैकल्पिक प्रश्नोत्तरी

संगीत "तबला" विषय
की स्नातक/स्नात्तकोत्तर प्रवेश
परीक्षाओं में निःशंक सफलता
हेतु एकमात्र पुस्तक



डॉ. सीमा जौहरी

पं. राम शंकर दास स्वामी– पागल दास जी का व्यक्तित्व एवं कृतित्वः एक अध्ययन

लेखिका

सीमा जौहरी

Mahamaya

महामाया पब्लिशिंग हाउस

नई दिल्ली (भारत)

आचार्य शीलक राम

अथातो भारतीय दर्शनशास्त्र

Social Harmony and Nation Building

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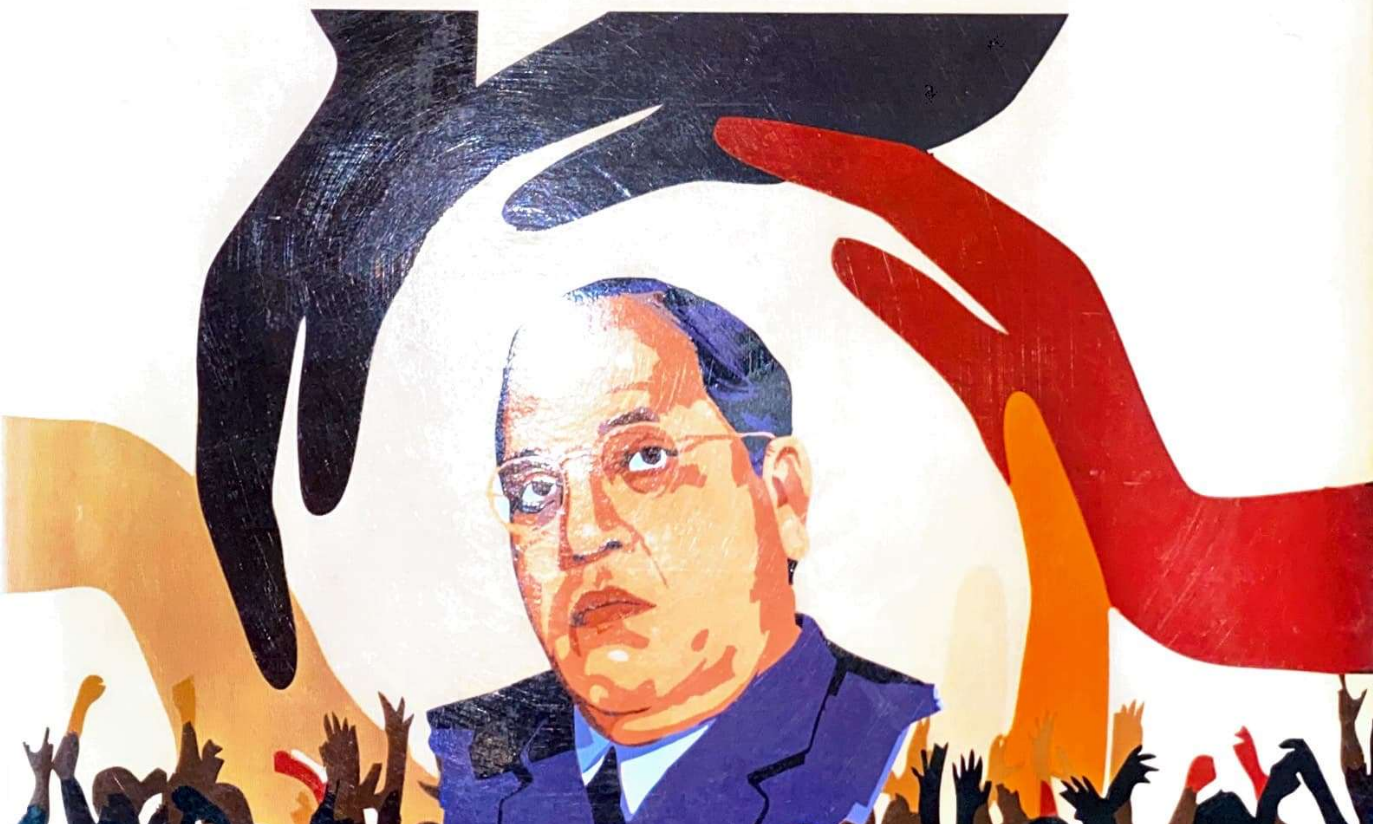

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Social Harmony and Nation-Building:

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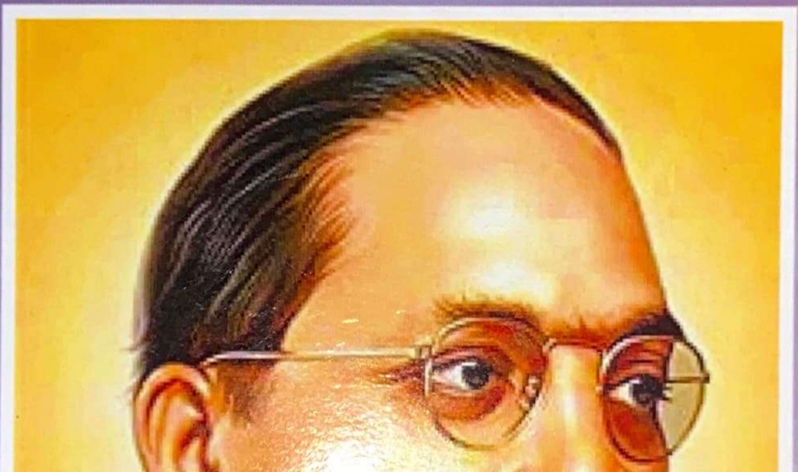
Revisiting
Bhimrao Ambedkar

A Study of Social and Political Justice



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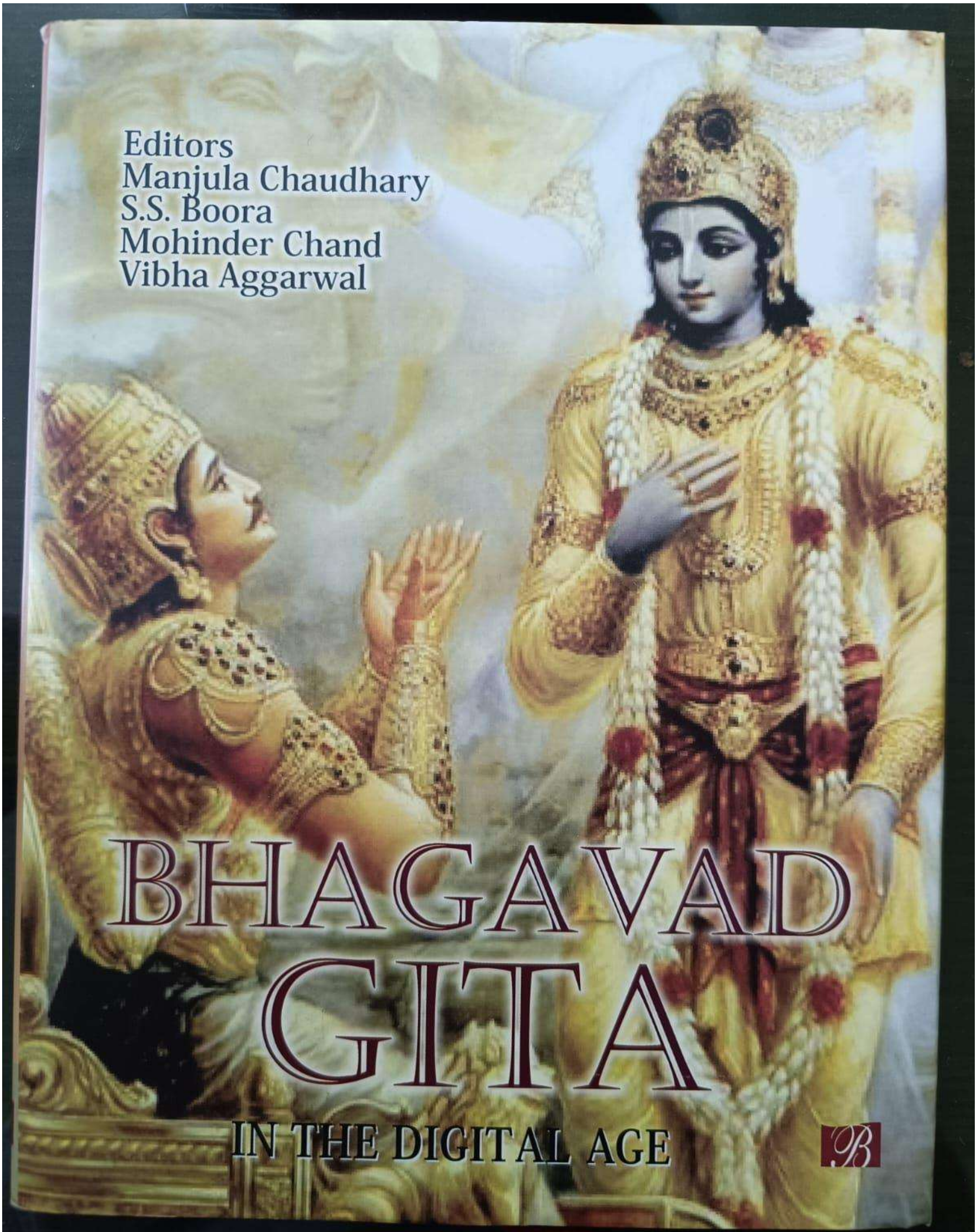
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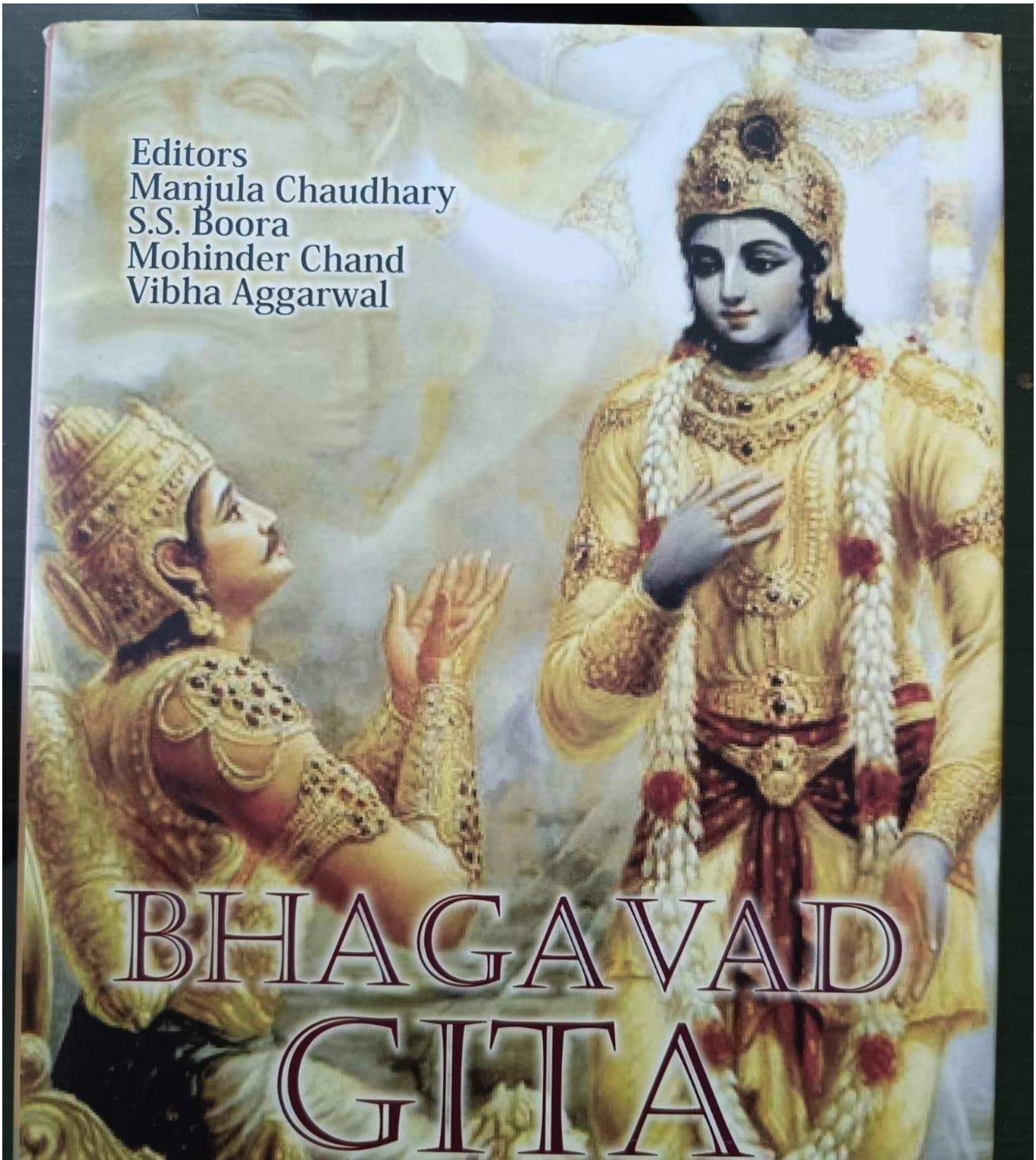
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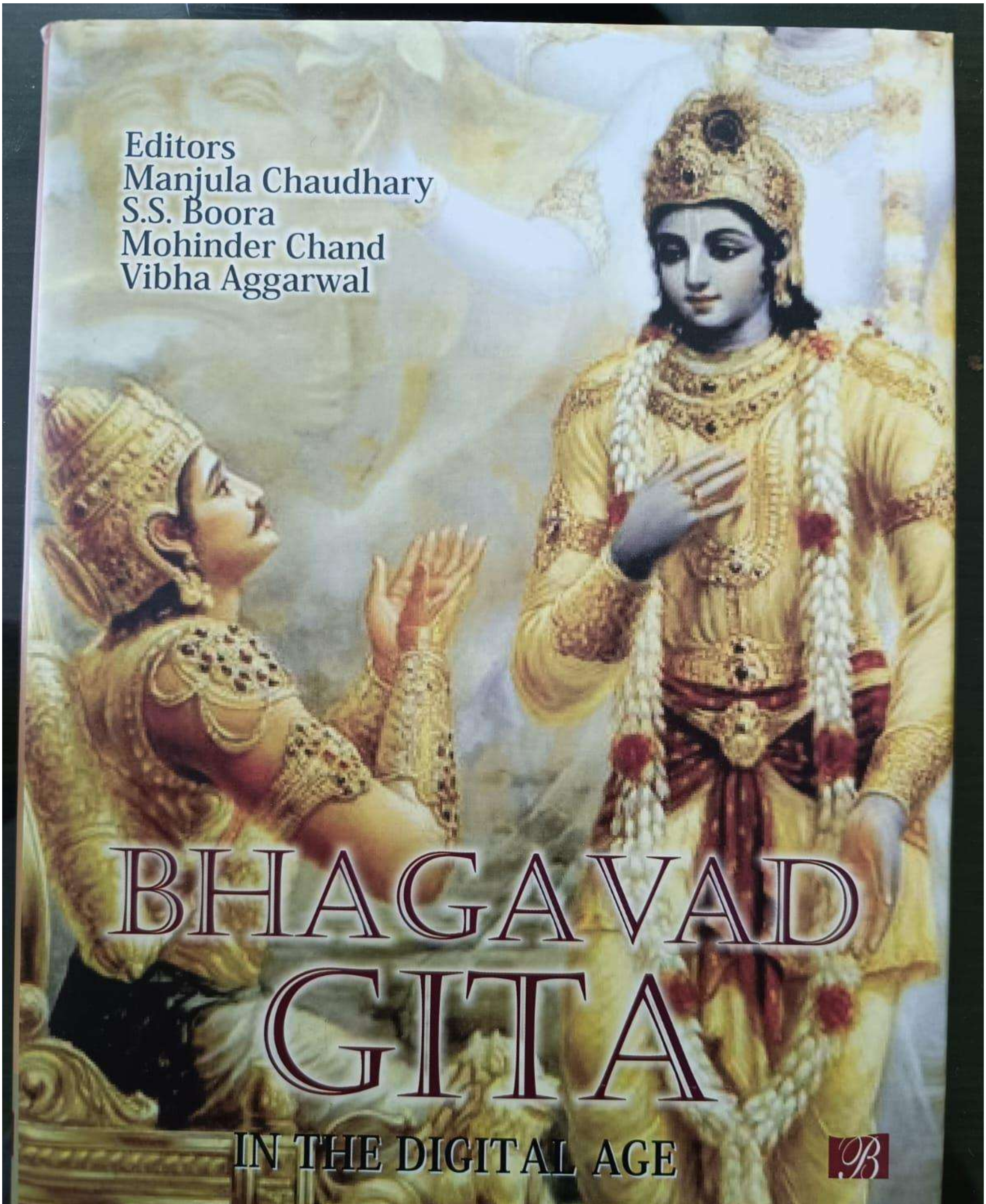
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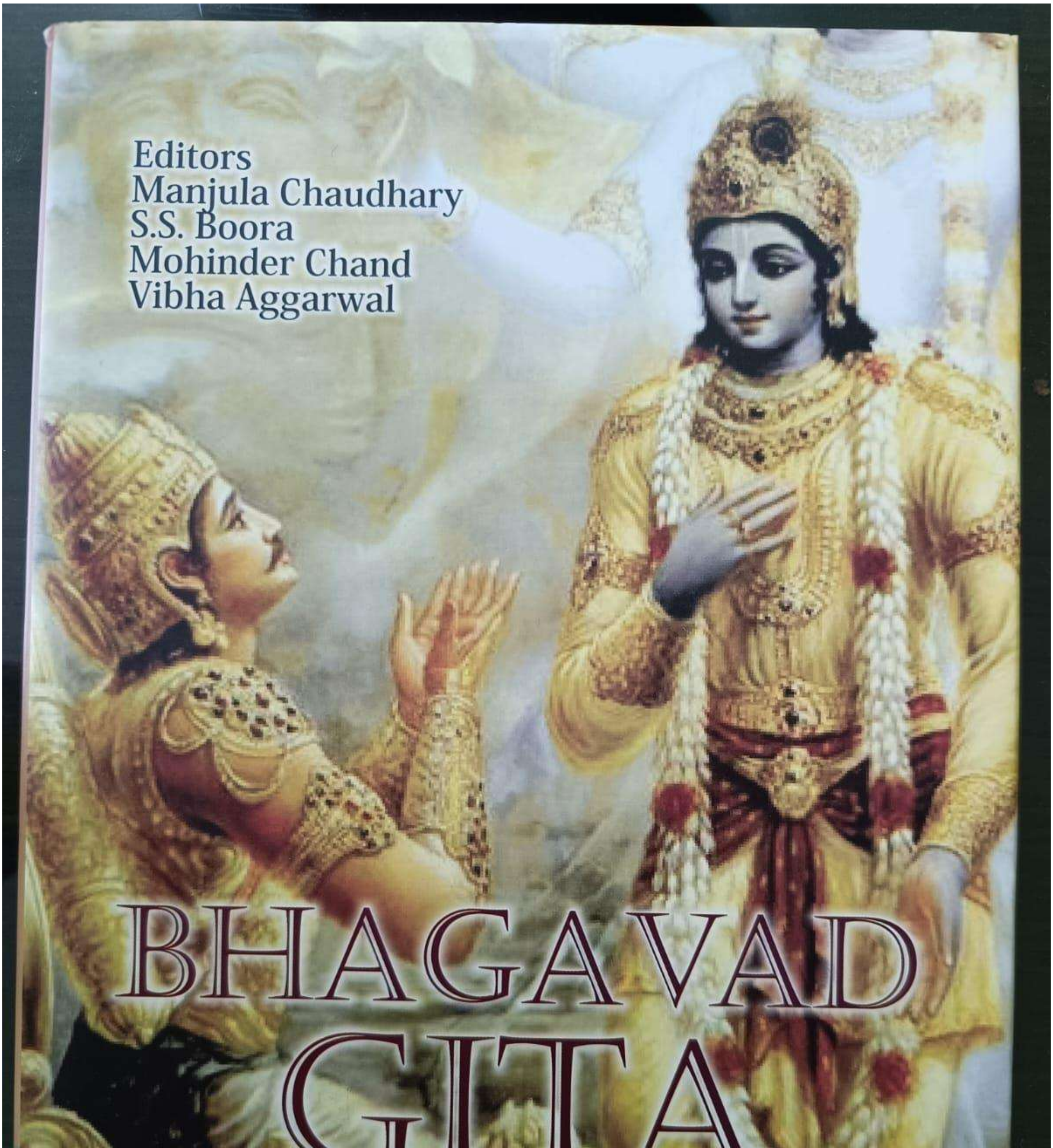
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Sino-US Trade War:
A New Challenge to Globalisation

Surender Mor

The bookSino-US Trade War: A New Challenge to Globalisation is a collection of manuscripts deliberated upon in the International Symposium on "Sino-US Trade War: A Potential Threat to World Peace and Prosperity" organized by Faculty of Social Sciences, BhagatPhool Singh Mahila Vishwavidyalaya, Sonipat, India on August 06, 2018. The book is an attempt to highlight some of issues arising out of the ongoing Sino- US trade war which are of immense practical significance. The book tries to analyse the efficacy of WTO in managing the present scenariobesides analysing the spirit of free trade. Apart from analyzing the possibility of third world war, currency war, global depression etc., the book explores the process of Globalization and its end in due to this trade spate. Finally, the book recapitulates the impact of this trade war on world development in addition to its impact on India.The book will contribute to existing knowledge and help scholars, researchers, policy makers, administrators and academicians in predicting the incidence of this trade war besides suggesting strategies/ policies/ courses of action not only for resolving the trade conflict but to minimise its impact on global economy. The book will establishes the new thoughts and wisdom and try to provide a better understanding of the ongoing trade war between US and China to various classes of readers.

Sino-US Trade War:
A New Challenge to Globalisation

Edited by
Surender Mor
Professor Deptartment of Economics

Bhagat Phool Singh Mahila Vishwavidyalaya
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Critical Analysis of Sino-US Trade War: Potential Impacts on Rest of the World and India

Pradeep S. Chauhan

American President Donald Trump announced import duties of 25 per cent and 10 per cent on steel and aluminium respectively. The move came under attack from the European Union, with EU Trade Commissioner Cecilia Malmstrom saying at a conference in Brussels that the imposition would "put thousands of European jobs in jeopardy, and it has to be met by a firm and proportionate response". The EU retorted by proposing a 25 per cent tariff on US steel, clothing, and other industrial goods. The US then went on to levy a 25 per cent tariff on more than 1,300 Chinese goods. And China responded by levying additional duty on 106 American products. Analysts, however, feel that this trade war may be short lived, and impending negotiations will help in defusing the tension. There are three possible reasons. First, the federal law that President Trump has used to issue a notice seeking public comments for the imposition of 25 per cent customs duty on over 1,300 Chinese items requires his administration to seek "consultations" with China before imposing the levies. US Commerce Secretary Wilbur Ross said on CNBC that he expected trade actions between the US and China to lead to a "negotiated deal". China's retaliatory move does not explicitly indicate when the additional tariffs would take effect. Second, the Chinese government said it would appeal to the World Trade Organisation's Dispute Settlement Body (DSB) for adjudication. This requires consultations before China presents its

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Echoes Within : Poems

Jimmy Sharma

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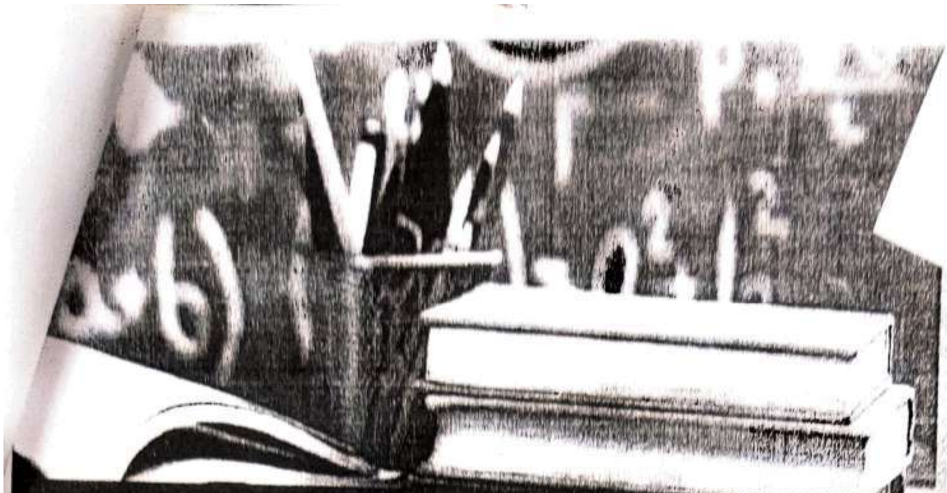
CHALLENGES TO BIODIVERSITY CONSERVATION AND SUSTAINABLE DEVELOPMENT

Raj Pal Singh • Kuldeep Yadav
Meenu Rathi • Shikha Jaggi



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Sustainable Inclusion: Removing Barriers to Inclusion by Recognizing and Respecting Diversity

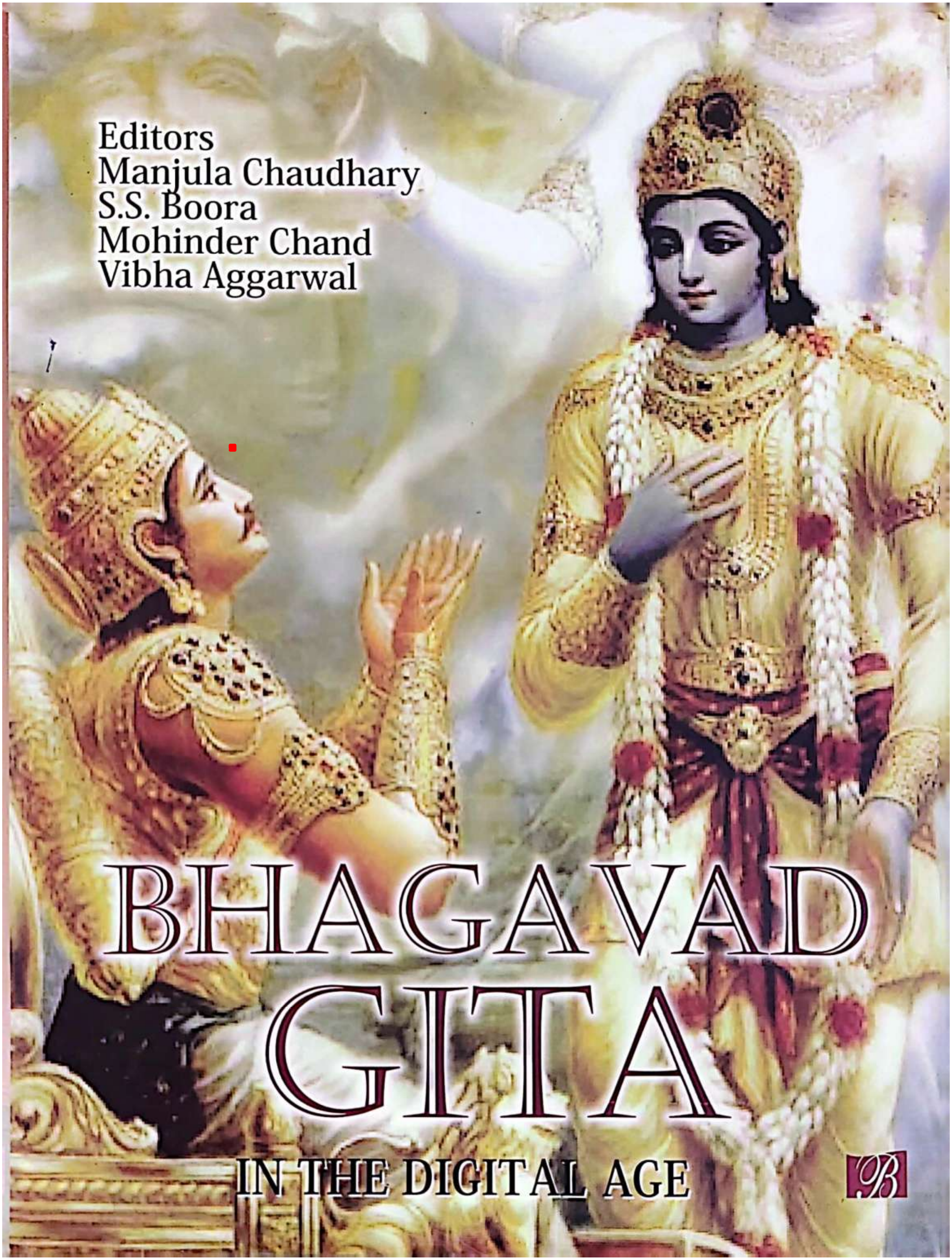
Taruna Choudhery Dhall

Introduction

At the outset attention is drawn towards two quotes that dictate the shape and intention of this paper.

- "5 minutes after your birth, they decide your name, nationality and religion and you spend the rest of your life defending something you didn't choose." *Fb the idealist*
- "Without the human society, one single human being cannot survive." *Dalai Lama*

Generating academic discussion in the field of Inclusion is obviously based on the premise that there is a section that is perceived to be excluded either by being ignored or by denial of entry. We, in this part of the world, have probably grown up under the philosophical influence of *Vasudhaiva Kutumbakam* which means "the world is one family". Conscious efforts by the state and subjects alike made to put in place Systems to cater to the well-being of all. Assumption behind this being that cohesive society is able to build upon the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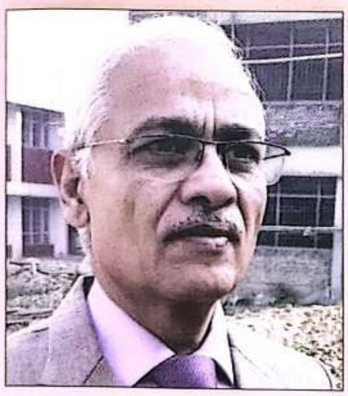
About the Editors

Prof. Manjula Chaudhary is working in the Dept of Tourism and Hotel Management, Kurukshetra University and has been associated with tourism education and research for the past 20 years. She has been Director of Indian Institute of Tourism and Travel Management under Ministry of Tourism, Government of India. She has published a number of books and research articles. She has been associated with a number of initiatives of tourism promotion in the country in various capacities.



Prof. S.S. Boora is actively engaged in the teaching and research at the Department of Tourism & Hotel Management, Kurukshetra University, Kurukshetra. He has number of articles to his credit published in the journals of repute. Presently he is Director, Institute of Mass Communication & Media Technology, K. U. Kurukshetra. His areas of concern are Indian culture, tourism management and sustainable tourism. He has been holding important administrative positions in his parent University.

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Bhagavad Geeta-Quintessential Wisdom of Business Excellence

Dr. Rajan Sharma*

ABSTRACT

Management in practice is testing its practices, principles & paradigms on continuous basis. The modern management theory has great insights, principles and theories to achieve business excellence. At the same time, one can still observe a continuance and dynamic shift in paradigms. In the realms of business environment, things are becoming complex, complicated and difficult day by day. In view of the dynamic and complex environment, management practitioners have to introspect the principles and adapt new principles to fulfill the objective of business excellence. In view of the same, management fraternity is on continuous lookout for principles and guidelines, which are beyond time and valid for always, everyone globally. In this line, there has been an upsurge in the international acceptability, awareness and spread in paradigms laid down by Bhagwad Geeta. In view of the above, this research paper is a humble attempt to explore the principles of Bhagwad Geeta and delve deep into the interpretations and implications for achieving business excellence. The embedded codes of Bhagwad Geeta through its various verses and chapters is relevant for all times for individuals as well as business organizations to achieve excellence in its true spirits.

Key worlds: Excellence, Social Welfare, Kalyaan, Triguna, Vritti, Privartti, Yoga.

Management practices in contemporary context and its theories have been developed in the last 150 years, with the inception of industrial organizations in the west being established. In order to achieve business excellence, Organizations are continually evolving and adopting best management practices based on the accumulated experience and resources which are available from the management thinkers, management theorists & management practitioners.

* Assistant Professor, Institute of Management Studies, Kurukshetra University, Kurukshetra, Haryana.

MAKING NEW INDIA: INSIGHTS FROM BHAGAVAD GITA

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