Project Code: SLC-306

Topic: Relativistic atomic calculations useful for Plasma and Astrophysics

Project Investigators: Dr. Narendra Singh (Dept. of Physics), Dr. Sunny Aggarwal (Dept. of Physics) and Dr. Balram Kindra (Dept. of Mathematics)

Summary: In this project we are working on atomic data calculations which are eventually useful in ongoing plasma research and Tokamak machines that can perform a well-controlled fusion reaction on earth. Apart from this, we have calculated the different atomic properties of highly charged ions. This data is useful for understanding many aspects of laboratory and astrophysical plasma as well as can address numerous problems associated with the spectroscopy of charged ions such as fusion plasma. It is also beneficial for spectroscopic analysis of the radiation emitted by the sun and lastly but not surely limited, to obtain various information about the stars by comparing the absorption lines of the sun with known data.

During the research, we have determined the accurate energy levels, radiative rates, lifetimes, mixing coefficients and oscillator strength for Ne-like Ge atom. We have communicated this paper for publication in Peer Reviewed Journal.

We intend to use this data to solve the energy crises that we are sure to face in upcoming decades. Because of the ever growing demand of energy for our industries, railways, etc., we are putting a huge strain on available natural resources. As we know that these natural resources are non-renewable, scientists have always been looking for alternative sources of energy. Hence, the search for a viable alternative to fossil fuels lead to the advent of Nuclear Power. Under nuclear power we have two methods to generate energy- the nuclear fission and nuclear fusion. Nuclear fission has proved to be an effective source, but has many associated environmental risks. On the other hand, nuclear fusion is something which can end our search for the alternative sources and it has been found that nuclear fusion, if performed successfully can generate a tremendous amount of energy with almost no environmental hazards.


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Detail of Students involved in Innovation Projects

Project No.	Project	Student's Name	Course's Name	Year
306	**"Relativistic Atomic Structure Calculations for Plasma and Astrophysics"** (Dr. Narendra Singh, Dr. Balram Kindra and Dr. Sunny Aggarwal)	Rhythm Sharma	B.Sc.(H) Physics	III
		Abhishek Dhawan	B.Sc.(H) Physics	III
		Shivani Agarwal	B.Sc.(H) Physics	III
		Vibha Mahawar	B.Sc. Physical Sc.	II
		Aashutosh Sharma	B.Sc. Physical Sc.	II
		Shruti Gupta	B.Sc. Physical Sc.	II
		Monika Pandey	B.Sc. Physical Sc.	II
		Himanshi Sharma	B.Sc. Physical Sc.	II
		Ruchika Sharma	B.Sc. Physical Sc.	II
		Neha Mahto	B.Sc. Physical Sc.	II