

## CANDIDATE'S DECLARATION

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I, **Bipin Kumar Singh**, certify that the work embodied in this Ph.D. thesis is my own bonafide work carried out by me under the supervision of **Dr. Praveen Chandra Pandey**, Department of Physics, IIT (BHU) Varanasi for a period of approximately 5 years 1 month from 14<sup>th</sup> September, 2011 to 24<sup>th</sup> October, 2016 at Indian Institute of Technology (Banaras Hindu University), Varanasi. The matter embodied in this Ph.D. thesis has not been submitted for the award of any other degree/diploma.

I declare that I have faithfully acknowledged, given credit to and referred to the research workers wherever their works have been cited in the text and the body of the thesis. I further certify that I have not willfully lifted up some other's works, para, text, data, result, etc. reported in the journals, books, magazines, reports, dissertations, thesis, etc., or available at websites and included them in this Ph.D. thesis and cited as my own work.

**Date:**

**Place:** Varanasi

(**Bipin Kumar Singh**)

## CERTIFICATE FROM THE SUPERVISOR

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This is to certify that the above statement made by the candidate is correct to the best of our knowledge.

**Dr. Praveen Chandra Pandey**  
(Supervisor)

**Prof. Debaprasad Giri**  
Head