Dr. M. Hemalatha
Email: hema [at] cbs [dot] ac [dot] in
Phone: 91-22- 26524986; Fax: 91-22-26524982

Educational Details

- Bhabha Atomic Research Centre, Mumbai, India
- Degree awarded by University of Mumbai, Mumbai, India

Ph.D. (Science) – Nuclear Physics **Year** 2005 (awarded 2007)
Thesis: *"Study of Exotic Nuclei"*

Experience

1. Research Associate at Physics Department, Indian Institute of Technology, I.I.T. – Bombay, Mumbai, India, August 2006 – September 2007.
2. Worked as a Visiting Scientist at Atomic Physics Department, GSI, Darmstadt, Germany during April – July 2004.
3. Worked at Department of Chemistry, Mainz University, Mainz, Germany, during May – July 2004.

Research Interest

1. Production of neutron-deficient nuclei by heavy ion fusion reactions using Pelletron accelerator : The determination of the feasibility of producing such nuclei in sufficient amount and optimisation of the production rates so as to perform the measurement of the ground state properties of these isotopes.
2. Nuclear Physics using Laser Spectroscopy : The development of the versatile fluorescence cell and the high sensitive laser induced fluorescence set up for measuring atomic isotope shift and hyperfine structures of stable and radioactive isotopes using laser spectroscopy.
3. Microscopic Optical model Calculations : Investigation of loosely bound nuclei have given rise to number of interesting and important discoveries in Nuclear physics. It is therefore interesting to investigate these exotic nuclei theoretically using models like Relativistic Mean Field (RMF). The densities obtained from RMF calculations are folded with energy and density dependant nucleon-nucleon interaction (for example, the extended Juukenne, Lejeune, and Mahaux (JLM), the Urbana V14 soft-core inter-nucleon intereaction) to calculate the real and imaginary parts of the optical model potentials. This semi-microscopically calculated optical potential are then used to get the total reaction, the differential cross sections and the analyzing power angular distributions. In this way, it is possible to predict the reaction cross sections and angular distributions for the elastic scattering for nuclei near drip line where no data exist.

Papers Published in International Journals

1. Weakening of the spin-orbit interaction with the increase of neutron number
   M. Hemalatha, Y.K. Gambhir, W. Haider and S. Kailas
   Phys.Rev. **C** *Sent* (2009).
2. Accelerator mass spectrometry programme and related developments at the BARC-TIFR Pelletron accelerator
   P. Surendran, A. Shrivastava, A.K. Gupta, R.M. Kale, J. P. Nair, ***M. Hemalatha***, K. Mahata, M.L. Yadav, H. Sparrow, R.G. Thomas, P.V. Bhagwat, S. Kailas
   Nucl. Inst. Meth. **A**, *In Press* (2009).
3. Microscopic optical model potentials for p-nucleus scattering at intermediate energies
   M. Hemalatha, S. Kailas, W. Haider, and Y. K. Gambhir
   Phys.Rev. **C75** 037602 (2007).
4. The study of exotic nuclei
   M. Hemalatha, S. Kailas and Y.K. Gambhir
   Hyperfine Interactions **162** 133 (2005).
5. Development of a high-sensitive fluorescence cell for measurement of atomic isotope shifts and hyperfine structures
   M. Hemalatha, S. Kailas, A. Venugopalan, B. N. Jagatap, and K. G. Manohar
   Nucl. Inst. Meth. **A572** 971 (2007).
6. Anamoly in the nuclear charge radii of Zr isotopes
   M. Hemalatha, A. Bhagwat, A. Shrivastava, S. Kailas, and Y.K. Gambhir
   Phy. Rev. **C70** 044320 (2004).
7. Production of neutron-deficient nuclei ^{127}Cs and ^{129}Cs by heavy-ion fusion reaction
   M. Hemalatha, S. Kailas, K. Mahata, A. Shrivastava, K. Ramachandran, and A. Chatterjee Nucl. Inst. Meth. **B531** 645 (2004).
8. Beam energy calibration for the folded ion tandem accelerator
   S. Santra, K. Mahata, P. Singh, C.V. Fernandes, ***M. Hemalatha***, and S. Kailas
   Nucl. Inst. Meth. **A496**, 44 (2003).