

Curriculum Vitae
Heshmatollah Yavari
Professor of Physics

ADDRESS

Department of Physics
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Education

- BSc of Physics: 1990-1994, University of Tabriz, Tabriz, Iran
- MSc of Physics: 1995-1997, University of Isfahan, Isfahan, Iran
Thesis Title: **Some properties of Fermi superfluid (Spin one): Application in spin polarized Lithium 6**
- PhD of Theoretical Physics: 1999-2004, University of Isfahan, Isfahan, Iran
Thesis Title: **Temperature dependence of some transport and magnetic coefficients in superfluid and superconductor systems**

Academic Status

- Assistant Professor, University of Isfahan (2005-2010)
- Associate Professor, University of Isfahan (2010 -2016)
- Professor, University of Isfahan (since 2016)

Current Research Interests:

Superconductivity and superfluidity, Bose-Einstein condensation, Strongly correlated systems, Ultracold atomic gases, Optical lattices, Granular electronic systems, Neutron stars, topological insulators and superconductors, Majorana fermions, Optoelectronic

Teaching Experience

- General Physics
- Classical Mechanics
- Statistical Mechanics
- Advance Quantum Mechanics
- Quantum Mechanics
- Quantum transport
- Many-Body Physics
- Quantum Field Theory in Condensed Matter Physics

Publications

1-M.A.Shahzamanian and H. Yavary, **Diffusive Thermal Conductivity of Superfluid ^6Li** , MSM-99, 213, (1999).

2-M.A. Shahzamanian, and H. Yavary, **The second viscosity of superfluid ^6Li** , International Journal of Modern Physics B. 16, 3797- 3802 (2002).

- 3-M.A. Shahzamanian, and H. Yavary, **The shear viscosity of superfluid ^6Li** , Physica B. 321, 385-387 (2002).
- 4-M.A. Shahzamanian, and H. Yavary, **Nonlocality and impurity effects on the magnetic penetration depth in d-wave superconductors**, J. Phys. Condens. Matter 15, 4577- 4582 (2003).
- 5-M.A. Shahzamanian, and H. Yavary, **Low temperature dependence of the penetration depth in superconductor MgB_2 in the presence and absence of impurities**, International Journal of Modern Physics B. 18, 369-377 (2004).
- 6- M.A. Shahzamanian, and H. Yavary, **The thermal conductivity of a trapped Bose-condensed gas**, Physica B. 352, 91-98 (2004).
- 7-M.A. Shahzamanian, and H. Yavary, **Phonon spectrum and damping of a dilute quantum degenerate Bose-Fermi mixture at finite temperature**, Phys. Lett. A. 340, 161-169 (2005).
- 8-M.A. Shahzamanian, and H. Yavary, **Low temperature dependence of the optical conductivity in superconductor MgB_2** , Physica B. 358, 103-108 (2005).
- 9-M.A. Shahzamanian, and H. Yavary, **The thermal conductivity of superfluid neutron stars**, International Journal of Modern Physics D. 14, 121-130 (2005).
- 10-M.A. Shahzamanian and H. Yavary, **The Spin Diffusion Coefficient of Superfluid ^6Li** , MSM-03, 22, (2003).
- 11- M.A. Shahzamanian and H. Yavary, **The shear viscosity of a trapped Bose gas**, Ann. Physics, 321, 1063(2006).
- 12- M.A. Shahzamanian and H. Yavary, **The thermal conductivity of superfluid B phase of ^3He in the presence of aerogel**, Phys. Stat. Solid(c) 3, No 9, 3135-3139(2006).
- 13- M.A. Shahzamanian, H. Yavary, and A. Yousefvand,, **Weak-Field Thermal Hall conductivity of $\text{YBa}_2\text{Cu}_3\text{O}_{6.99}$ at low Temperature**, Phys. Stat. Solid(c) 3, No 9, 3148-3151(2006).
- 14- M.A. Shahzamanian and H. Yavary, **The transverse Impedance of Normal Liquid ^3He** , International Journal of Modern Physics B. 12, 1-9 (2007).
- 15- H. Yavary, **Effect of Impurity Scattering on the Low Temperature Magnetic Penetration Depth of a Nonlocal and Nonlinear d-wave Superconductor**, Physica C 450 129-134(2006).
- 16-M A Shahzamanian, M Eatesami and H Yavary, **Analytical results of the Fokker–Planck equation derived for one superconducting nanowire quantum interference**

device and for DC SQUID symmetric devices, Supercond. Sci. Technol. **20** 1–10 (2007).

17- M A Shahzamanian, H Yavary, H. Rabbani and S. Darvishi, **Regeneralized London Free Energy of high- T_c vortex lattices**, Iranian Journal of Physics Research, vol 6, No 3, (2006).

18- M A Shahzamanian, M Eatesami and H Yavary, **Analytical results of the Fokker–Planck equation derived for one superconducting nanowire quantum interference device and for DC SQUIDs-a symmetric devices**, Ann.Physics, 322, 2501-2517 (2007).

19- M A Shahzamanian, M Eatesami and H Yavary, **One analytical formulation for the characteristics of the asymmetric NQIDs and DC SQUIDs**, Fifth International Conference in Magnetic and Superconducting Materials (MSM07).

20- M A Shahzamanian, H Rabbani, N. Salami, and H Yavary, **Fermi liquid interactions and relaxation rate of thermal quasiparticles in a d-wave superconductor**, Fifth International Conference in Magnetic and Superconducting Materials (MSM07).

21. H Yavary, M A Shahzamanian, and H Rabbani, **Critical currents and fields of disordered nanocrystalline superconductors**, Fifth International Conference in Magnetic and Superconducting Materials (MSM07).

22- H Yavary, M A Shahzamanian, H Rabbani, and M. Shahbazi, **Heat capacity of one-dimensional ^3He quantum fluid formed in nanopores**, Fifth International Conference in Magnetic and Superconducting Materials (MSM07).

23- H Rabbani, M A Shahzamanian, and H Yavary, **Unstability of the Fulde-Ferrell state in d-wave superconductors by calculating the magnetic penetration depth**, Fifth International Conference in Magnetic and Superconducting Materials (MSM07).

24- H. Yavari, Z. Khajeh, **Low temperature magnetic penetration depth of a superconductor without inversion symmetry: Application to CePt $_3$ Si**, Physica C 470, 168–173 (2010).

25- H. Yavari, M. Chaharlang, B. Ghafournia, **Superfluid transition temperature in a dilute Bose–Fermi mixture with imbalanced two-component Fermi gas**, Physica B 405, 2283–2285 (2010).

26- H. Yavari, M. Erfan, **Effect of impurities on the low temperature NMR relaxation rate of a noncentrosymmetric superconductor**, Solid State Communications 150 (2010) 2049–2052.

27- M. Moarrefi, H. Yavari, M. Elahi, **Temperature dependence of the optical conductivity and penetration depth in superconductor MgB $_2$ film**, Physica B 405, 258–262 (2010).

- 28- H. Yavari , M. Ahmadniayemotlagh, Z. Mohammadi Chegini, **Nonlocal effect on the fluctuation conductivity of granular superconductors**, Ann.Physics, 326, 232–240 (2011).
- 29-M. Moarrefi-Romeileh, H.Yavarib, A.A.Joata-bayrami, M.R.Abolhassani, **Temperature dependence of transmittance and effective surface resistance of MgB₂ film**, Physica B 406, 4135–4138(2011).
- 30-H. Yavari, B. Ghafournia, **The shear viscosity of a two component Fermi gas with unequal population at low temperatures**, Solid State Communications 151, 177–182 (2011).
- 31-H. Yavari, E. Afsaneh, S. Mirzai, **Josephson effect in superfluid atomic Fermi gases at finite temperature**, Solid State Sciences 14 (2012) 1244-1249.
- 32- H. Yavari · M. Nemati, **Effects of Magnetic and Nonmagnetic Impurities on the Transition Temperature of a Noncentrosymmetrical Superconductor: Application to CePt₃Si**, J Low Temp Phys 166,90–100 (2012)
- 33- E. Afsaneh, H. Yavari ,**Critical current of a granular d-wave superconductor**, Solid State Communications, 152 1933–1938, (2012)
- 34- H. Yavari, **Temperature dependence of the frequency of superconducting resonators**, Phys. Express 2013, 3: 23.
- 35-H. Yavari and E. Afsaneh, **Effect of impurities on the transition temperature of a dilute dipolar trapped Bose gas**, Physical Review A 87, 013601 (2013).
- 36- H. Yavari, **Nonlocal effect on the diamagnetic susceptibility of a granular superconductor**, J Low Temp Phys (2013) 173:21–27
- 37- H. Yavari, M. Mokhtari, and M. Tamaddonpour, **Effects of magnetic and nonmagnetic impurities on the spin susceptibility of a noncentrosymmetrical superconductor: Application to CePt₃Si**, Journal of applied physics 114, 163912 (2013).
- 38- E. Afsaneh · H. Yavari, **Influence of Superconducting Leads Energy Gap on Electron Transport Through Double Quantum Dot by Markovian Quantum Master Equation Approach**, Few-Body System 55,159–170 (2014).
- 39- H. Yavari and M. Mokhtari, **Effects of impurity and Bose-Fermi interactions on the transition temperature of a dilute dipolar Bose-Einstein condensation in trapped Bose-Fermi mixtures**, Journal of applied physics 115, 093904 (2014).
- 40- H. Yavari · M. Mokhtari · A. Bayervand, **Temperature Dependence of the Spin-Hall Conductivity of a Two-Dimensional Impure Rashba Electron Gas in the Presence of Electron–Phonon and Electron–Electron Interactions**, J Low Temp Phys 178,331–344 (2015).

- 41-M. Eghbali-Arani, H. Yavari, 2 M. A. Shahzamanian, V. Giovannetti, and Sh. Barzanjeh, **Generating quantum discord between two distant Bose–Einstein condensates with Bell-like detection**, J. Opt. Soc. Am. B / Vol. 32, No. 5 (2015).
- 42- M. Eghbali-Arani, Sh. Barzanjeh, H. Yavari, M.A. Shahzamanian, **Cooling of a nanomechanical resonator in presence of a single diatomic molecule**, Annals of Physics 355, 130–142 (2015).
- 43- H. Yavari, E. Afsaneh, M. A. Shahzamanian, **Magnetic field dependence of the critical current in a granular s-wave superconductor**, Sci. Lett., 4, 87 (2015).
- 44-S. Mostafa Moniri, Heshmatollah Yavari and Elnaz Darsheshdar, **Effect of long-range $1/r$ interactions on the Landau damping in a Bose-Fermi mixture** Eur. Phys. J. Plus 131, 122 (2016).
- 45-E. Darsheshdar, H. Yavari and S.M. Moniri, **Shear viscosity of quasi-2D dipolar Bose-Fermi mixtures with long-range $1/r$ interactions**, Eur. Phys. J. Plus 131 , 178 (2016).
- 46-M. Yazdani-Hamid, H. Yavari and M. A. Shahzamanian, **The Hall viscosity of a two-orbital chiral superconductor Sr_2RuO_4** , EPL, 114 1,7007 (2016).
- 47-E. Darsheshdar, H. Yavari , Z. Zangeneh, **Low temperatures shear viscosity of a two-component dipolar Fermi gas with unequal population**, Annals of Physics, 370 , 105-116 (2016).
- 48-M Biderang, H Yavari, **Spin Hall conductivity in the impure two-dimensional Rashba s-wave superconductor** , Physica C: Superconductivity and its applications, 525, 100-104 (2016).
- 49- S M Moniri, H Yavari , and E Darsheshdar, **Landau damping in a dipolar Bose–Fermi mixture in the Bose–Einstein condensation (BEC) limit**, Chin. Phys. B Vol. 25, 126700 (2016).
- 50- S. Mostafa Moniri, Heshmatollah Yavari, and Elnaz Darsheshdar, **Depletion of the condensate in a dipolar Bose condensed gas in the presence of impurities**, Eur. Phys. J. Plus 363, 131(2016).
- 51-H. Yavari, Biderang, and M. Kouhfar, **Effect of nonlinearity, magnetic and nonmagnetic impurities, and spin-orbit scattering on the nonlocal microwave response of a d-wave superconductor**, Low Temperature Physics/Fizika Nizkikh Temperatur, 42, 1094,(2016).
- 52- M. Yazdani-Hamid, H. Yavari, M. A. Shahzamanian, A. Karimi, **Low-Temperature Dependence of the Shear Viscosity in Superconductor Sr_2RuO_4** , J Supercond Nov Magn, 30, 865 (2017).

- 53- H.Yavari, **Temperature Dependence of the Thermal Conductivity of a Trapped Dipolar Bose-Condensed Gas**, Brazilian Journal of Physics, 48, 31–38 (2018).
- 54-Elaheh Afsaneh, Heshmatollah Yavari, **Phase-dependent heat current of granular Josephson junction for different geometries**, Physics Letters A 382, 2388–2393 (2018).
- 55- Mehdi Biderang, Heshmatollah Yavari, Mohammad-Hossein Zare, Peter Thalmeier, and Alireza Akbari, **Edge currents as a probe of the strongly spin-polarized topological noncentrosymmetric superconductors**, Phys. Rev. B 98, 014524 – Published 30 July 2018.
- 56-Moulud Tamaddonpur, Heshmatollah Yavari, and Zahra Saeidi, **Effect of long-range $1/r$ interaction on thermal and quantum depletion of a dipolar quasi-two-dimensional Bose gas**, Low Temp. Phys. 45, 1187 (2019).
- 57-Heshmatollah Yavari and Forouzan Forouharmanesh, **Effects of Thermally Induced Roton-Like Excitation on the Superfluid Density of a Quasi-2D Dipolar Bose Condensed Gas**, Ann.der Phys. 532, 1900412 (2020),.
- 58-H Yavari, **Progress in the development and construction of high temperature Superconducting magnets**, Supercond. Sci. Technol. 33 , 100501 (2020).
- 59-Meghdad Yazdani. Hamid and Heshmatollah Yavari, **Anomalous viscosity of a chiral two orbital superconductor in tight binding model**, The European Physical Journal Plus, 136, 478 (2021).
- 60- Moloud Tamadonpour and Heshmatollah Yavari, **Effects of hybridization and spin–orbit coupling to induce odd-frequency pairing in two-band superconductors**, The European Physical Journal Plus , 136, 922 (2021).
- 61- Mustafa Moniri, Heshmatollah Yavari , Elnaz Darsheshdar , **Shear viscosity in the strong interaction regime of a p-wave superfluid Fermi gas**, Physics Letters A 400:127308 (2021).
- 62- Seyed Mostafa Moniri, Heshmatollah Yavari, Elnaz Darsheshdar **Three-body and Coulomb interactions in a quasi-two-dimensional dipolar Bose-condensed gas**, Annals of Physics, 438, 168788 (2022).

Books:

- 1-Heshmatollah Yavari "Superconductivity - Theory and Applications" InTech, Published: July 18, 2011, ISBN 978-953-307-151-0, Chapter 7 **Effects of Impurities on a Noncentrosymmetric Superconductor: Application to CePt₃Si**,.
- 2- Heshmatollah Yavari, **On the Properties of Novel Superconductors**. IntechOpen, Published in London, United Kingdom 2020.

Reviewed papers

- 1- 4.6 T generated by a high temperature superconducting ring magnet (**Superconductivity. Science and Technology**)
- 2- Advanced McMillan's equation and its application for the analysis of highly compressed superconductors (**Superconductivity. Science and Technology**)
- 3- Change of electronic state in the noncentrosymmetric superconductor ThFe_3 (**Superconductivity. Science and Technology**)
- 4- Crossover from paramagnetic to diamagnetic ac-susceptibility in $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ superconductor for H_{jjc} - axis (**Superconductivity. Science and Technology**)
- 5- Debye temperature in highly compressed H_3S and D_3S (**Superconductivity. Science and Technology**)
- 6- Superconductivity in noncentrosymmetric Mo_3P single crystal (**Superconductivity. Science and Technology**)
- 7- Superconducting properties of the ternary boride YRh_4B_4 (**Superconductivity. Science and Technology**)
- 8-Optically Tailored Trapping Geometries for Ultracold Atoms on a Type-II Superconducting Chip (**Applied Physics Letters**)
- 9-Dielectric and Diamagnetic Susceptibilities near Percolative Superconductor-Insulator Transitions (**Journal of Physics: Condensed matters**)
- 10- Bose-Einstein condensation in a mixture of interacting Bose and Fermi particles (**Journal of Physics: Condensed matters**)
- 11-Quantum Chaos for the Unitary Fermi Gas from the Generalized Boltzmann Equations (**Journal of Physics B: Atomic, Molecular and Optical Physics**)
- 12- Effects of three-body interactions in a Bose gas at finite temperature (**PHYSICA SPECTRA**)
- 13-Electronic transport in the superconducting nanocomposite of CNTs encapsulated Sn nanorods (**Journal of Nanotechnology**)
- 14- Thermodynamic Properties of Fermi Gases at Low-temperature under the Generalized Uncertainty Principle (**Journal of Low Temperature Physics**)
- 15-Size, Shape and Impurity Effects On Transition Temperature of Nano-structured Superconductors (**European Conference on Applied Superconductivity**).
- 16- Impurity Effects on Transition Temperatures of NanoStructured Superconductors (**European Conference on Applied Superconductivity**)
- 17- PRESSURE EFFECT ON SUPERCONDUCTING CRITICAL TEMPERATURE ACCORDING TO STRING MODEL (**World Journal of Condensed Matter Physics**)
- 18- A Fermi Energy-Incorporated Framework for Dealing with the Temperature- and Magnetic Field-Dependent Critical Current Densities of Superconductors and its Application to Bi-2212 (**World Journal of Condensed Matter Physics**)
- 19- Electronic transport in the superconducting nanocomposite of CNTs encapsulated Sn nanorods(**World Journal of Condensed Matter Physics**).
- 20-Abnormal transport properties of $\text{Bi-}\square$ superconducting phase in pressurized bismuth single crystal (**Superconductivity. Science and Technology**)
- 21-Bogoliubov spectrum and the dynamic structure factor in a quasi-two-dimensional spin-orbit coupled BEC (**Journal of Physics B: Atomic, Molecular and Optical Physics**).

- 21- Superconductor superfluid density from the BCS-Bose crossover theory (**SN Applied Sciences**).
- 22- Magneto transport behavior of $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}\text{Sm}_{0.55}\text{Sr}_{0.45}\text{MnO}_3$ superconducting ferromagnetic composite thin films (**PHYSICA SPECTRA**).
- 23- Nonmagnetic scattering induced suppression of superfluid density in Bi-2212 (**Materials Research Express**).
- 24- Collective excitations of a general spin-3/2 Fermi gas (**Journal of Physics B: Atomic, Molecular and Optical Physics**).
- 25- Theoretical study of multiband Superconductivity and Enhanced Superconducting Transition Temperature (T_c) in Rhenium Beryllium superconductor (**Materials Research Express**).
- 26- AC Back Surface recombination velocity as applied to optimize the base thickness under temperature of an (n^+-p-p^+) bifacial Silicon Solar Cell, back illuminated by a light with long wavelength, (**World Journal of Condensed Matter Physics**).
- 27- Theoretical Investigation of the Influence of Intra and Interlayer Coupling on High T_c Superconducting $\text{Nd}_{2-x}\text{Ce}_x\text{CuO}_4$ (**Advances in Condensed Matter Physics**).

MSc and PhD Theses Supervision (2006-2022)

- 1- Calculation of hot relaxation time in d-wave superconductors **MSc** (Nadia Salami)
- 2- Theory of operation of a quantum interference device made from two superconducting nanowires and two superconducting mesoscopic lead, **PhD** (Mohammad Etesami)
- 3- Possibility of forming quantum fluid in Helium 3 in nano porosity, **MSc** (Maryam Shahbazi)
- 4- Superfluidity in Fermi gases with nonzero angular momentum, **MSc** (Morteza Khademipour)
- 5- Some transport and magnetic properties in nano scale systems, **PhD** (Hassan Rabbani).
- 6- Thermal transport in granular superconductor systems, **MSc** (Maryam Ahmadnia)
- 7- Linear nodes in the energy gap function of noncentrosymmetrical superconductor Si_3CEPT , **MSc** (Zohre Khaje).
- 8- Some properties of superfluid Bose and Fermi mixtures systems, **MSc** (Marzieh Charlang).
- 9- Transport properties of d-wave superconductors in the presence of impurities, **MSc** (Mohammad Ali Erfan).
- 10- Transition temperature of Bose gases with dipole interaction, **MSc** (Fatemeh Nabipour).
- 11- Transport collisions of a polarized fermi gas with resonance interaction, **MSc** (Bahareh Ghafournia).
- 12- Electronic and magnetic properties of nano layer junction Mo-AgF-Cu , **MSc** (Akram Kabiri).
- 13- First principle study of Josephson junction in nano metal- isolator-superconductor layers, **MSc** (Neda Barati).
- 14- Investigation of transport properties in granular superconductors, **MSc** (Zeynab Chegeni).
- 15- Some properties of a trapped Fermi gas, **MSc** (Saeed Mirzai).

- 16- Effects of impurity on superconductors without inversion symmetry, **MSc** (Maedeh Nemati).
- 17- Transition temperature of a trapped dipolar bose gas in the presence of contact, dipole-dipole interactions and impurity, **MSc** (Narges Tayyebi).
- 18- Transport properties nano grain superconductors, **MSc** (Amire Sadat Mousavinasab).
- 19- Threshold of Fredericks transition in a Nematic Liquid Crystals include Ferroelectric nano particles, **MSc** (Mojtaba Farrokhbin).
- 20- Properties of a superfluid bose gas in the presence of impurities, **MSc** (Maryam Mokhtari).
- 21- Temperature dependence of some properties in superconductors without inversion symmetry, **MSc** (Moloud Tamaddonpour).
- 22- Quantum Hall effect in quantum electrodynamics, **MSc** (Aboutaleb Bayervand).
- 23- Electronic properties of granular metal and superconductor systems, **MSc** (Mahbubeh Mahdavi).
- 24- Thermal conductivity of a trapped bose gas in the presence of dipole-dipole interaction, **MSc** (Zohreh Fathi).
- 25- Transport properties of a superfluid Fermi gas, **MSc** (Ziba Zangeneh).
- 26- Investigation of Quantum Properties of Hybrid Systems composed of Superconducting Circuits and BEC, **PhD** (Mohammad Eghbali Arani).
- 27- Transport study of open and closed condensed system, **PhD** (Elahe Afsaneh).
- 28- Transport properties of superfluid neutron stars, **MSc** (Fateme Mozaffari).
- 29- Effect of temperature on superconductor resonators, **MSc** (Mohsen Kouhfar).
- 30- Effect of long range interaction on the properties of ultracold bose gases, **PhD** (Mostafa Moniri).
- 31- Edge states, magnetic and transport properties of chiral superconductors, **PhD** (Meghdad Yazdani Hamid).
- 32- Effects of interactions on the properties of a superfluid trapped Fermi gas, **PhD** (Elnaz Darsheshdar).
- 33- Investigation of transport properties of degenerate bose gases in optical lattice, **MSc** (Forugh Mashhadizade).
- 34- Properties of low dimensional Bose Einstein condensation systems, **MSc** (Zahra Saidi).
- 35- Transport properties of low dimensional superconductors in the presence of spin orbit interaction, **MSc** (Monire Sadat Tayeba).
- 36- Investigation of properties of a fermi gas in BCS-BEC crossover regime, **MSc** (Amin Reza Kadkhodai).
- 37- Investigation of transport properties of noncentrosymmetrical superconductors as topological matters, **PhD** (Mehdi Biderang).
- 38- Investigation of supersolid phase in ultracold Fermi gases with long range interaction, **MSc** (Foruzan Foruharmanesh).
- 39- Superfluid Fermi atomic gases as a quantum simulator for the study of strong correlated systems, **MSc** (Parisa Arab Jafari).
- 40- Effects of thermal and quantum fluctuations on the properties of superconductors with multiple broken symmetry, **PhD** (Moloud Tamaddonpour).
- 41- Thermodynamic and electrodynamic properties of superconductors in mesoscopic regime, **MSc** (Omide Saber).