"ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षणमहर्षी डॉ. बापूजी साळुंखे
Shri Swami Vivekanand Shikshan Sanstha, Kolhapur's
शिक्षणमहर्षी डॉ. बापूजी साळुंखे महाविद्यालय, मिरज
SHIKSHANMAHARSHI DR. BAPUJI SALUNKHE COLLEGE, MIRAJ
Tal. Miraj, Dist. Sangli (M.S.) 416 410
Govt. Sanction No. Education & Social Welfare Dept. Notification No. UKF 5765-U, Dated 27-08-1965
Affiliated to Shivaji University, Kolhapur
Jr. College App. No. - HSC/1976 - 18972 A (S Y) Date : 7/5/1976 Jr. College Code No. - J.22.08.003 UDISE No. - 27351000519
● E-mail- smdbscmiraj@rediffmail.com ● Website : www.smbdscmiraj.in ● ☎ (Off.) 0233- 2232181 (Resi.) : 0233- 2329850 ●

PROMOTER-FOUNDER
Shikshanmaharshi Dr. Bapuji Salunkhe
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M.L.A.

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M.A.

SECRETARY
Prin. Sou. Shubhangi M. Gawade
M.Sc., B.Ed.

I/C PRINCIPAL
Prof. (Dr.) Satish Ghatge
M.A., M.Phil., Ph.D.

Ref. No. 845/22-23
Date : 08/08/2022

To,
Prof. (Mrs.) J. P. Jadhav
Co-ordinator, RGSTC Scheme,
Department of Biotechnology,
Shivaji University, Kolhapur.

Subject: Submission of proposal of the project for the RGSTC scheme implemented through Shivaji University, Kolhapur

Respected Madam,

I am herewith submitting proposal of the project of Dr. Milind M. Sutar entitled **"Establishment of Shivaji University Scrap LEDs/ CFL Lamps Repairing Centre under e-waste management"** under the scheme "Assistance for S & T Applications through University System" implemented by RGSTC, Government of Maharashtra, Mumbai. Hence request you to kindly consider the project proposal for reviewing process and oblige.

Encl.: Project Proposal (08 Copies)

Yours faithfully,

Prof. (Dr.) Satish Ghatge
I/C Principal,
Shikshanmaharshi Dr. Bapuji Salunkhe
College, Miraj. (Dist. Sangli)

A.A. Thombare
26/8/2022
For Registrar
Shivaji University
Kolhapur

A Project entitled

"Establishment of Shivaji University Scrap LEDs/ CFL Lamps Repairing Center"

Submitted By

Dr. Milind M. Sutar

Department of Physics

Shri Swami Vivekanand Shikshan Sanstha, Kolhapur's

Shikshanmaharshi

Dr. Bapuji Salunkhe College,

Miraj, Dist. Sangli (Maharashtra State) India

416410

(Affiliated to Shivaji University, Kolhapur)

To

Rajiv Gandhi Science & Technology Commission

Government of Maharashtra

Scheme "Assistance for S &T Applications Through University System"

PROPOSALS UNDER THE SCHEME "ASSISTANCE FOR S&T APPLICATIONS THROUGH UNIVERSITY SYSTEM" OF RAJIV GANDHI SCIENCE AND TECHNOLOGY COMMISSION, GOVERNMENT OF MAHARASHTRA.

A. IDENTIFICATION

1. Project title

"Establishment of Shivaji University Scrap LEDs/ CFL Lamps Repairing Center Under E-waste Management"

Key Words: Shivaji University, LEDs / CFL, E-Waste.

2. Broad Area

(i) S&T Studies/Surveys. (St)

We have opted the use of Power Light Emitting Diodes(LEDs) Lamps and Compact Fluorescents Lamps (CFLs) to conserve electricity because the natural resources that provide the electricity are being exhausted. Conserving electricity saves money, since electricity prices are charged in accordance with the electricity consumed and also protects the environment because to generate electricity, most power plants burn coal, crude oil or other fossil fuels. In comparison with light intensity, the LEDs / CFL lamps found more efficient than the incandescent light bulbs.

(ii) Location Specific Research & Technology Development. (LSR)

There are also a large number of medical institutions, polytechnics, ITIs, management institutions, educational Institutes, Research Institutes, Universities, Hotels, Lodges, Malls, government offices etc. generally uses LEDs/ CFL lamps for lighting purpose. When the LEDs/ CFL are exhausted, these hundreds of LEDs/ CFL we thrown as a scrap material. So after thinking on this problem, I have found the solution to re-use the Scrap LEDs/ CFL.

(iii) S & T Demonstration Projects. (DP)

Already we have the E-Waste management Programme. From June 2014, Golden jubilee year of the Institute, Physics Department has successfully run the E-waste management programme for the faculty members. Under this, we repair the faulty electronics appliances free of charge (only charging the materials cost).

(iv) Replication of Successful Models. (RP)

As we are conducting the E-Waste management Programme, so we have the good confidence in repairing the electronics appliances. till today we have repaired more than 100 LEDs/ CFL.

(v) Joint S & T Programmes on specific theme. (please specify) (JP) Nil

(vi) Awareness & Training on specific topic. (Please specify) (TRG)

We have Conducted three days workshop with the title "Build your Own Stereo Amplifier", at school level for delivering the training to the students of class 9th and 10th. In this about 20 stereo amplifiers have assembled by the students. For this workshop funding was provided by the K.P.S.P.

School, Vishrambaug, Sangli. Besides demonstrated and write few innovative electronics articles and Published in reputed electronics magazine "Electronics For You" (Sheet attached separately)

4. Duration: (number of months): Nov 2022 to Oct, 2024. (24 months)

5. Total Cost: **Rs. 4,00,000/-(Four lakh only)**

6. Principal Investigator:

Name: **Dr. Milind Madhusudan Sutar**

Department: Physics

Designation: Assistant Professor

Organisation/Institution Name: Shikshanmaharshi Dr. Bapuji Salunkhe College, Miraj, Dist. Sangli, Pin-416410.

Address (Including Telephone (official & residence), E-mail, Fax) :

Miraj- Pandharpur Road, Near Govt. guest House, Miraj, Dist. Sangli.

Pin 416410 Email:smilind20066@gmail.com Mobile:7588252204.

7. Co-Investigator:

Name:- **Dr. Heramb Prabhakar Gaikwad**

Designation:- Assit. Professor

Department:- Physics

Organization/Inst. Name:- Shikshanmaharshi Dr. Bapuji Salunkhe College, Miraj, Dist. Sangli, Pin-416410.

Address: (Including Telephone (official & residence), E-mail, Fax):

Miraj - Pandharpur Road, Near Govt. guest House, Miraj, Dist. Sangli.

Pin 416410 **Email:herambgaikwad1@gmail.com Mobile: 9766887202.**

8. Capability of the Organization:

(a) Major Facilities

There is a well-equipped Physics and Electronics laboratory. In addition to this there is Department's staff room, Material research laboratory and Dark room.

- Recognized Physics laboratories for research work.
- Department have provided with Computer and Internet facility

(b) Expertise available

1. Dr. P. S. Patil

Professor, Dept. of Physics and Pro-Vice Chancellor, Shivaji University, Kolhapur.

2. Dr. K. Y. Rajpure.

Professor & Head, Dept. of Physics, Shivaji University, Kolhapur.

3. Dr. R. G. Sonkawade

Professor, Dept. of Physics, Shivaji University, Kolhapur.

4. Dr. N. L. Tarwal

Assit. Professor, Dept. of Physics, Shivaji University, Kolhapur.

(c) Completed project giving the following details (Co-Principal Investigator).

Project Title	Start date	Completion date	Project cost	Sponsoring organisation.
Synthesis & Dielectric Analysis of Barium Neodymium Titanates for Microwave Applications. in subject Physics, No.F-47-1271/2009(WRO)	31/03/2010	31/03/2012 (Two Years)	Rs. 1,30,000 /- (Rupees One Lakh thirty Thousand Only)	UGC, New Delhi

B.

TECHNICAL DETAILS

1. Background

Description of problem

There are large number of medical institutions, polytechnics, ITIs, management institutions, educational Institutes, Research Institutes, Universities, Hotels, Lodges, Malls, government offices etc. generally today uses LEDs/ CFL lamps for saving electricity and lighting purpose. When the LEDs/ CFL lamps are exhausted, these hundreds of LEDs/ CFL we thrown as a scrap material. After thinking on this problem, we have found the solution to re-use the Scrap LEDs/ CFL lamps at the material cost (minimum charges) only.

Review of work already done

LEDs Lamps and Compact fluorescent lamps (CFLs) are available in different shapes and power ratings. These consist of an electronic Convertor/ ballast circuit and a triple /twin type etc. fluorescent glass tube. Most LEDs Lamps and CFL manufacturers offer a guarantee of a year on their product. In an unserviceable LEDs Lamps only few Power LEDs are damaged due to ageing effect or high voltage. This particular damage in LEDs Lamp can be repaired simply by replacing single unit of power LED. In case of CFL, the filament has reached the end of its life. But there is every possibility that the electronic ballast circuit (PCB) inside the bottom of the CFL is in working condition. Many times there is always problem in filament of the glass tubes.

In repairing mode of LEDs Lamp, we remove the Cover. Investigate for number of faulty LEDs. After removing the faulty LEDs, the new LEDs are soldered in their place. In CFL Lamp, the used glass tubes replaced with new fluorescent glass tubes which are available in different sizes and wattages. We have carefully opened the base of LEDs/ CFL Lamp holder using an appropriate tool. The electronic Convertor/ballast circuit on a circular PCB is observed inside the plastic case.

Rational for taking up the project

Actually the exhausted LEDs/ CFL lamp has little problem. Hence most of the electronics components are in working condition. In the fabrication of these devices like integrated circuits(ICs), transistors, FETs etc. many valuable metals like Gold, Silver, tungsten, Molybdenum etc. are used. By using these repaired LEDs/ CFL lamps it is equivalent to save thousands of rupees.

Technical support under the Scheme "E-Waste Management" is being provided for maintenance of Domestic home Appliances and sophisticated electronics instruments to the College employees by the Department of Physics.

Relevance to State priorities: Nil

2. Challenge

1. The students of B.Sc. electronics can be trained to do this work.
2. The required components can made available from Kolhapur or Sangli.

Constraints

1. Difficult to collect the scrap LEDs/ CFL from lamp holders which are at height.
2. There is danger of getting hurt by glass while opening the lamp.

3. Description of Proposal

Objectives of the project. (Brief and to the point)

Most CFL manufacturers offer a guarantee of a year on their product. In an unserviceable CFL, the filament has reached the end of its life. But there is every possibility that the electronic ballast circuit inside the bottom of the CFL is in working condition. Many times there is always problem infilament of the glass tubes. In repairing, we remove the CFL glass tubes and replace them with new fluorescent glass tubes which are available in different sizes and wattages. The minimum charges ofmaterial cost under repairing the scrap CFL or scrap LEDs lamp will be borne by the institute who wants to repair the scrap CFL or scrap LEDs lamp.

Preliminary Investigations done by Organization. (if any): Nil

S&T component in the project.: Nil

Linkage with S&T Institutions / NGOs / resource persons / R&D organization /Industry for technical backup. Nil

Other organizations working in this area. Nil

Methodology detailing stepwise activities and sub-activities.

4. Work Plan

In first part of the project the scrap LEDs /CFLs lamps will be collected by sending email to different institute affiliated to the Shivaji University, Kolhapur.

After collection, in the middle part of the project, problems in each lamp are to be detected and reasonable repairing cost is communicated to their institute. The desired parts are then order from the vendors. After replacing the faulty part lamp are return to the institutes for their Re- use.

5. Output of the Project

It is estimated that the lamp having cost around Rs.400 - 500/- can be repaired only by removing anexhausted tube by new florescent glass tube. This offers the life to the lamp again for same period.

The amount collected against the repairing cost is further used for extension of the Project anddevelopment of the Institute.

6. Likely Impact (Please attempt to quantify): Nil

7. Parameters for monitoring effectiveness of project: Nil.

8. Suggested Post Project Activities: Nil.

C. BUDGET ESTIMATES: SUMMARY

Item	**BUDGET** (In Rupees)		
	1st Year	**2nd Year**	**Total**
A. Recurring			
1. Salaries/Wages	84,000/-	84,000/-	1,68,000/-
2. Consumables	50,000/-	50,000/-	1,00,000/-
3. Travel	10,000/-	---	10,000/-
4. Other Costs	20,000/-	10,000/-	30,000/-
			Total Rs. 3,08,000/-
B. Non-Recurring			
Permanent Equipment	92,000/-	-----	92,000/-
Grand Total (A+B)	3,08,000/-	+ 92,000/- =	4,00,000/-

BUDGET FOR SALARIES/WAGES (In Rupee)

Designation (number of persons)	**Monthly Emoluments Rs.6000/-**	**BUDGET** 1styr. **(12 months)**	2 nd yr. **(12 months)**	Total **(24 months)**
Full time				
i)Technician:		72,000/-	72,000/-	1,44,000/-
ii} Assistant		12,000/-	12,000/-	24,000/-
				Total = 1,68,000/-

The minimum charges of material cost of the scrap CFL or scrap LEDs lamp will be borne bythe institute who wants to repair the scrap CFL or scrap LEDs lamp.

BUDGET FOR PERMANENT EQUIPMENT (In Rupee)

Sr.No.	Name of equipment *	Estimates cost
1.	Electric Drill machine (350w) with stand	4000/-
2.	Taparia 475mm Plastic Tool Box	2000/-
3.	Table and chair for Repairing	6000/-
4.	Laser Scanner printer Copier for Billing	20,000/-
5.	Bench cutting-grinding machine	5000/-
6.	Miscellaneous(LEDs/ CFL spare parts)	55,000/-
	Total Rs.	92,000/-

D. PROFORMA FOR BIODATA OF INVESTIGATORS

A. Name : Dr. Milind Madhusudan Sutar

B. Date of Birth: 01st June 1970.

C. Institution: Shikshanmaharshi Dr. Bapuji Salunkhe College, Miraj, Dist. Sangli, Pin-416410.

D. Academic career: M.Sc., M.Phil., Ph.D.

E. Professional career:

F. Award/prize/certificate etc. won by the investigator: Teacher Fellowship Award.

G. Publication (Numbers only):

Books = 12

Research Paper, report:

PI:- International = 08, National =02

General articles = 05

Co-PI:- International = 10, National =02

Patents = Nil.

Others (please specify) = Interested in Design and development of Instrumentation setups, and repairing the instruments.

H. List of completed and ongoing projects

Sr.No.	Title of project	Duration	Total cost	Funding	From To
1.	Synthesis & Dielectric Analysis of Barium Neodymium Titanates for Microwave Applications. in subject Physics, No.F-47-1271/2009(WRO)	Two Years	Rs. 1,30,000 /- (Rupees One Lakh thirty Thousand Only)	UGC, New Delhi	31/03/2010-31/03/2012

I. Projects submitted

Sr.No.	Title of project	Name of Organisation	Status
--	---	--	---

(Dr. Milind M. Sutar)

Date : 04th August 2022

Place: Miraj

"ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षणप्रसार" - शिक्षणमहर्षी डॉ. बापूजी साळुंखे
Shri Swami Vivekanand Shikshan Sanstha, Kolhapur's
SHIKSHANMAHARSHI DR. BAPUJI SALUNKHE COLLEGE, MIRAJ
Tal.- Miraj, Dist.- Sangli (M.S.) Pin - 416 410
Govt. Sanction No. Education & Social Welfare Dept. Notification No. UKF 5765-U, Dated 27-08-1965
Permanently affiliated to Shivaji University, Kolhapur
NAAC Accredited with CGPA of 2.89 on a seven point scale at B++ Grade
Junior College Code No. : J.22.08.003

● E-mail- smdbscmiraj@rediffmail.com ● Website :www. smbdscmiraj.in ● ☎ (Off.) 0233- 2232181 (Resi.) : 0233- 2329850 ●

PROMOTER-FOUNDER
Shikshanmaharshi Dr. Bapuji Salunkhe
B.A.,B.T.,D.Lit.

PRESIDENT
Hon. Chandrakant (Dada) Patil
M.L.A.

CHAIRMAN
Prin. Abhaykumar Salunkhe
M.A.

SECRETARY
Prin. Sou. Shubhangi M. Gawade
M.Sc., B.Ed.

I/C PRINCIPAL
Prof. (Dr) Satish Ghatge

Ref. No.

Date :

Annexure – I

ENDORSEMENT FROM THE HEAD OF INSTITUTION

PROJECT TITLE: "Establishment of Shivaji University Scrap LEDs/ CFL Lamps Repairing Center Under E-waste and electrical energy Conservation"

1. Certified that the Institute welcomes participation of Dr. Milind Madhusudan Sutar as the Principal Investigator for the project and that in the unforeseen discontinuance by the Principal Investigator, will assume the responsibility of the fruitful completion of the project (with due intimation to the University).
2. Certified that the equipment, other basic facilities and such other administrative facilities as per terms and conditions of the grant, will be extended to investigator(s) throughout the duration of the project.
3. Institute assumes to undertake the financial and other management responsibilities of the project.

(Prof. Dr. Satish Ghatge)

I/C Principal,
Shikshanmaharshi Dr. Bapuji Salunkhe
College, Miraj. (Dist. Sangli)

Date : 04th August 2022

Place: Miraj

Annexure – II

CERTIFICATE FROM THE INVESTIGATOR

PROJECT TITLE: **"Establishment of Shivaji University Scrap LEDs/ CFL Lamps Repairing Center Under E-waste and electrical energy Conservation"**

1. I/We agree to abide by the terms and conditions of the RGSTC grant.
2. I/We did not submit this or a similar project proposal elsewhere for financial support.
3. I/We have explored and ensured that equipment and basic facilities will actually be available as and when required for the purpose of the project. I/We shall not require financial support under this project, for procurement of these items.
4. I/We undertake that spare time on permanent equipment will be made available to other users.
5. I/We enclose the following materials.

ITEMS	NUMBER OF COPIES
(a) Endorsement from the Head of the Institution (on letter head)	One
(b) Details of the proposals	08
(c) Registration Certificate, Memorandum of Association, rules and regulations of the Institution, audited Balance sheet and Annual Report of previous two years. (applicable only for NGOs, field groups, registered societies)	Nil
d) Any other (Please specify)	Nil

Name & Signature of Investigator

(Dr. M. M. Sutar)

Date : 04th August 2022

Place Miraj

"ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षणप्रसार" - शिक्षणमहर्षी डॉ. बापूजी साळुंखे
Shri Swami Vivekanand Shikshan Sanstha, Kolhapur's

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Ref. No. 609/2022-23
Date : 19/12/2022

To,

The Registrar,

Board of College and University Development,

Shivaji University, Kolhapur.

Subject: Submission of the Research Project proposals Under RESEARCH INITIATION SCHEME.......

Reference: SU/M.V.Vi.Vi. Vibhag/RIS/1123 dated 29th Nov2022.

Respected Sir,

I am herewith sending the proposal of the project of Dr. Milind M. Sutar entitled " ***Study of the Enhanced Magnetic Properties of nano Synthesized Mn Substituted Cobalt Ferrite as a Magnetostrictive Phase for ME composites.*** under the scheme **"DIAMOND JUBILEE RESEARCH INITIATION SCHEME"** implemented by Shivaji University, Kolhapur. Hence request you to kindly consider the project proposal for reviewing process and oblige.

Thanking you,

Encl.: Project Proposal

Yours faithfully,

[signature]

Prof. (Dr.) Satish Ghatge

I/C Principal,
Shikshanmaharshi Dr. Bapuji Salunkhe
College, Miraj. (Dist. Sangli)

[signature] 20/12/22
For Registrar
Shivaji University
Kolhapur

"ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी विद्यामंदिर" – विवेकानंदांची सं. बापूजी साळुंखे
Shri Swami Vivekanand Shikshan Sanstha, Kolhapur's
SHIKSHANMAHARSHI DR. BAPUJI SALUNKHE COLLEGE, MIRAJ
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M.Sc., B.Ed.

I/C PRINCIPAL
Prof. (Dr) Satish Ghatge

Ref. No. 609/2022-23
Date : 19/12/2022

To,

The Registrar,

Board of College and University Development,

Shivaji University, Kolhapur.

Subject: Submission of the Research Project proposals Under RESEARCH INITIATION SCHEME.....

Reference: SU/M.V.Vi.Vi. Vibhag/RIS/1123 dated 29th Nov2022.

Respected Sir,

I am herewith sending the proposal of the project of Dr. Milind M. Sutar entitled "*Study of the Enhanced Magnetic Properties of nano Synthesized Mn Substituted Cobalt Ferrite as a Magnetostrictive Phase for ME composites.* under the scheme "**DIAMOND JUBILEE RESEARCH INITIATION SCHEME**" implemented by Shivaji University, Kolhapur. Hence request you to kindly consider the project proposal for reviewing process and oblige.

Thanking you,

Encl.: Project Proposal

Yours faithfully,

Prof. (Dr.) Satish Ghatge

I/C Principal,
Shikshanmaharshi Dr. Bapuji Salunkhe
College, Miraj. (Dist. Sangli)

SHIVAJI UNIVERSITY, KOLHAPUR

DIAMOND JUBILEE

RESEARCH INITIATION SCHEME

Format for Submission of Proposal for Research Project

PART – I

1) Broad Subject: **Physics** Faculty: **Science**

2) Area of Specialization: Solid State Physics

3) Duration: **2 Years**

4) Principal Investigator:

i)	Name	Milind Madhusudan Sutar
ii)	Sex	Male
iii)	Date of Birth	01st June,1970
iv)	Qualification	M.Sc., M.Phil.,Ph.D.
v)	Designation	Assistant Professor
vi)	Address Office: Residence:	Department of Physics, Shikshanmaharshi Dr. Bapuji Salunkhe College, Miraj, Dist: Sangli. Pin.416 410(MS). Department of Physics, Shikshanmaharshi Dr. Bapuji Salunkhe College, Miraj, Dist: Sangli. Pin.416 410(MS).
vii)	Date of joining the service as a teacher	11th December, 1993.
viii)	Date of confirmation	11th December 1995

5) Co – Investigator(s) (If any):

i)	Name	----
ii)	Sex	Male ~~/Female~~
iii)	Date of Birth	----
iv)	Qualification	----
v)	Designation	----
vi)	Address Office : Residence :	--- ---

6) Details of the College/Institution where the project will be undertaken:

a. Department: Physics

b. Name of the College: Shikshanmaharshi Dr. Bapuji Salunkhe College.

7) Teaching and Research Experience of Principal Investigator

a.	Teaching experience	27 Years
b.	Research experience	07 years
c.	Title of Ph.D. /M. Phil. thesis if PI has been awarded	"Magnetoelectric And Magnetodielectric Properties of Ferrite-Ferroelectric Composites" "Structural And Dielectric Properties Of Modified Barium Titanate For Microwave Applications"
d.	Publications i. Papers Published Accepted Communicated	07
	ii. Books Published	12

(Please enclose the list of papers and books published and/or accepted during last five years)

Part II

Proposed Research work

8) i) Project Title: ***Study of the Enhanced Magnetic Properties of nano Synthesized Mn Substituted Cobalt Ferrite as a Magnetostrictive Phase for ME composites.***

ii) Introduction

Magnetostrictive materials having industrially important material have aroused considerable interest during last decade. The basic properties of Magnetostrictive materials such as structural, electrical, and magnetic etc. have been the subject of tremendous interest to physicists ,chemists and ceramists. The academic interest in the study of Magnetostrictive materials stems from the fact that they are the most important electronics and magnetic ceramics. The high potentials applications of Magnetostrictive materials in electronics microwave and computer technologist have focused the attention of many research workers on these materials. ferromagnetic have wide range of resistivity from semiconducting to insulating type. b) Grain size of individual crystallites, which influences the conduction path due to grain to grain contacts[1].

The present project proposal aims at a narrow section of this widely expanding area of research and development. Here the Magnetostrictive materials will be studied with the formation of Magnetostrictive materials to achieve higher values of quality factor (Q) and moderately lowered values of tunability.

• Origin of the Research Problem

The $CoFe_2O_4$, Mn substituted $CoFe_2O_4$ (CMFO) and substituted $LaSrMnO_3$ (LSMO) has shown a very large Magnetostrictive strain [7,8]. The second subgroup consists of magnets that display a large degree of magnetostriction as a common property. The materials in this class exhibit dielectric anomalies at their magnetic ordering temperatures and/or significant magnetocapacitance. MnO, $MnFe_2$, $TmFeO_3$, $Tb_3Fe_5O_{12}$ can be listed in this category. The most prominent example of a magnetodielectric reported so far is $EuTiO_3$. $EuTiO_3$ is an incipient ferroelectric (quantum ferroelectric). This means that there is a polar phonon mode associated with the dielectric constant, which tends to zero frequency as the temperature tends to zero.

• Interdisciplinary Relevance

In order continue historic progress, innovative device structures and new materials have to be created in order to continue the historic progress in Magnetostrictive system devices. For over decades, there has been increasing demands of Ferro Magnetostrictive materials of electrical performance every 2 to 3 years[2]. However, it is also well accepted that this long-term range of the 65-nm to 35-nm nodes remains solidly in the "no-known solution" category. This will require new structural, material and fabrication technology solutions that are generally compatible with current and forecasted installed Magnetostrictive devices manufacturing[3]. So Magnetostrictive low loss magnetic materials makes the high frequency and low control voltage operation possible apart from the reduction in size. Such reduced size, power efficient spintronics device will be very attractive for space application[4, 5].

• Review of Research and Development in the Subject:

Recently it is also reported that in addition to frustrated magnets and Magnetostrictive magnets, the ceramic and thin film composites of ferroelectric and ferromagnetic also show promising magnetodielectric effect. The composites of Piezoelectric and Piezomagnetic compound sarigated at nano-scale have also shown useful magnetoelectric and magnetodielectric coupling. Especially the composites of self-segregated clusters of magnetic $CoFe_2O_4$ and ferroelectric $BaTiO_3$ [9], $BaTiO_3$-γFe_2O_3 nano particles [10] and super lattices combining ferromagnetic (La Ca)MnO_3 with ferroelectric $BaTiO_3$ [5] are the few examples of MD systems.

• Significance of the study

The present project proposal aims at a narrow section of this widely expanding area of research and development. Here the Magnetostrictive materials will be studied with the

formation of magnetostrictive materials to achieve higher values of quality factor (Q) and moderately lowered values of tunability.

iii) Objective

As far as the measurement of λ is concerned, the literature shows that the tensometric techniques with the use of wire strain gauge is more commonly used as compared to interferometric arrangement to measure the change in length. Alternatively, the precision resistance meters or special purpose magnetostriction measurement units are costly and it would be interesting to design and develop a special purpose laboratory scale setup for the measurement of λ and standardize it by measuring λ on the materials like $CoFe_2O_4$ where earlier reports on λ are available [6].

iv) Methodology

For the present investigation following methodology will be adopted:

(i) Preparation of Materials:-

The materials will be prepared in the form of bulk via a chemical ceramic route or hydroxide co-precipitate technique will be used. This technique involves precipitation followed by condensation on some substrate. The materials will normally be taken oxides and nitrates or acetates. For precipitation acetates of Co will be mixed with ammonia in the presence of liquid ammonia as a complex. The required alkalinity of the medium will be acquired by adding NH_4OH. For reduction in size of particles, capping agents like thiophenol etc. will be used.

Different studies to characterize the prepared materials in bulk as well as nanoforms will be as follows:

(ii) Magnetic susceptibility / Magnetic permeability Studies:-

Such studies impart information's about the value and the nature of magnetism associated with the materials under study. The result of such studies will be compared from those of known magnetics studies. Normally susceptibility changes are expected under particle size reduction. Hence such studies will be useful in studying particle size effects.

(iii) Measurement of magnetostriction coefficient studies:-

Such studies are useful in understanding the effect of particle size on magnetostriction coefficient. Normally increases in magnetostriction coefficient are expected with reduction in particle size which may cause shift of ME or MD coefficient.

(iv) Scanning Electron Microscopic (SEM) studies:-

Such studies are useful regarding morphological features particle size etc. of the bulk. The nature of materials prepared and grain size etc. will be known from such studies. A correlation will be made between SEM and XRD studies.

(v) X-Ray Diffraction (XRD) Studies:-

For further characterization of these materials, X-ray diffraction (XRD) will be done. Parameters like crystal structure and the lattice constants etc. will be determined and correlated with nanoparticle studies.

(vi) The electrical conductivity studies: -

Proper electrodes will be formed on the pellet prepared by the silver paint technique and electrical conducting studies of the variety of bulk prepared will be undertaken under the excitations of temperature. Life time and mobility of the carries and the trap depth will be derived from such studies. Effect of particle size on electrical conductivity will also be investigated. Results obtained from the present studies will be interpreted in terms of either existing models or some new methods will be made, if required.

v) **Year wise Plan of work and targets to achieve. (Budget in Rupees)**

Heads	Ist Yr.	IInd Yr.	Total (Rs.)
Chemicals	30,000/-	20,000/-	50,000/-
Contingencies	15,000/-	5,000/-	20,000/-
Equipment	1,50,000/-	--	1,50,000/-
Total	1,95,000/-	25,000/-	2,20,000/-
	Total Rs.	**2,20,000/-**	

vi) Details of collaboration, if any intended

9) Financial Assistance required

Item	Estimated Expenditure (Rs.)
A) Non-recurring component *: (upto 70% of the project cost)	
i) Equipment which may include computer/laptop	1,50,000/-
ii) Books/Journals	10,000/-
B) Recurring component :	
(i) Hiring Services	50,000/-
(ii) Field Work and Travel	20,000/-
(iii) Chemicals and glassware	50,000/-
iv) Contingency (including special needs)	20,000/-
Total (Rs.)	3,00,000/-

Contingency (specification) with Utilization- The contingency will be used for the purchase of chemicals and books, and for the travelling allowances related to visits of other laboratories and attending National Seminars and Conferences as below:

Breakup under the following heads-

Sr.No.	Name of Items	Estimated cost as on date(Rs.)
(i)	Materials, Chemicals etc.	50,000/-
(ii)	Stationary, reprints, etc.	5,000/-
(iii)	TA expenditure for fieldwork	20,000/-
(iv)	Other items.	30,000/-
	(A)	**1,05,000/-**

3. Equipments (specification) with Utilization- The grant for equipment will be utilize for the purchase of followings:

S. No.	Name of Equipment	Specifications of equipment	No. of Units	Estimated cost as on date(Rs.)
(i)	Magnetostriction setup system(Including Roorky Electromagnet)	Laboratory Scale	01	90,000/-
(ii)	High Voltage Power Supply	(1000-1200) Volt Aplab	01	10,000/-
	Characterization charges	--	40,000/-	25,000/-
(iii)	Computer+ Printer	hp	01	70,000/-
	(B)		Total(Rs.)	**1,95,000/-**

Grand Total (Rs.)- **(A)+ (B) = 1,05,000/- + 1,95,000/- = 3,00,000/-**

10) (a) Details of the project/scheme completed or ongoing with the P.I

Name of the Equipment	Year	Total Infrastructural facilities obtained	Agency	Started	Completed
1200 0C Furnace (Indfur)	2011-12	Physics Laboratory	UGC	2010	2013
Magnetic Stirrer	2011-12	Physics Laboratory			
Glassware	2011-12	Physics Laboratory			

(b) Institutional and Departmental facilities available for the proposed work:

Equipment: mentioned in above table.

11) Any other information which the investigator may like to give in support of this proposal Which may be helpful in evaluating.

To certify that:

a) General physical facilities, such as furniture/space etc., are available in the College/ Institution.

b) I/we shall abide by the rules governing the scheme in case assistance is provided to me/us from the University for the Above Project.

c) I/we shall complete the project within the stipulated period. If I/we fail to do so and if the University is not satisfied with the progress of the research project, the University may terminate the project immediately and ask for the refund of the amount received by me/us.

d) The above Research Project is not funded by any other agency.

Name and Signature

(a) Principal Investigator — Dr. Sutar Milind M.

(b) Co- Investigator ----

(c) Principal / Head of the University Department (Signature with Seal)

I/C Principal,
Shikshanmaharshi Dr. Bapuji Salunkhe
College, Miraj. (Dist. Sangli)

Annexure-B

SHIVAJI UNIVERSITY, KOLHAPUR
DIAMOND JUBILEE
RESEARCH INITIATION SCHEME
Acceptance Certificate for Research Project

Name : Dr. Milind Madhusudan Sutar

No. 7588252204 dated 20th December 2022

Title of the Project: ***Study of the Enhanced Magnetic Properties of nano Synthesized Mn Substituted Cobalt Ferrite as a Magnetostrictive Phase for ME composites.***

1) The research project is not being supported by any other funding agency.

2) The terms and conditions related to the grant are acceptable to the Principal Investigator and College/Institution.

3) At present, I have no research project approved by University and the accounts for the previous project, if any have been settled.

4) The date of implementation of the project is 1st June 2023

(Dr.Milind M.Sutar)
Principal Investigator

Prof.(Dr.)Satish R.Ghatge.
I/C Principal,
Shikshanmaharshi Dr. Bapuji Salunkhe
College, Miraj. (Dist. Sangli)

Dated:19th December,2022

Bank Details of Principal Investigator

Sr. No.	Name of the Account Holder	Dr. Milind Madhusudan Sutar
1.	Bank Name & Address	Bank of Maharashtra
2.	Bank Account Number	20144946726
3.	Type of Account	Savings
4.	IFSC Code	MAHB0000235
5.	MICR Code	416014153

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