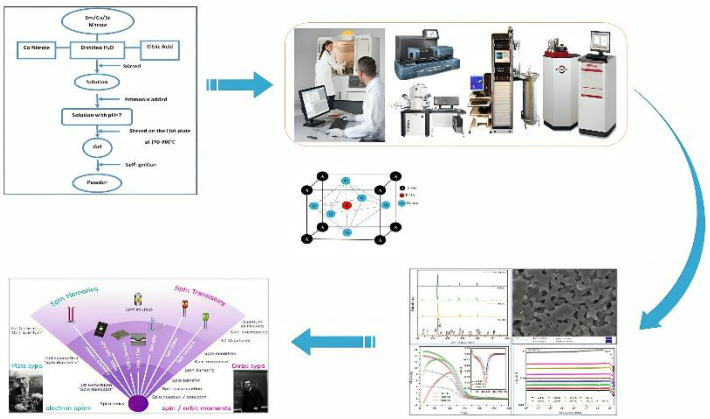
Website Information
Department of Physics
Dayananda Sagar University

Faculty details:

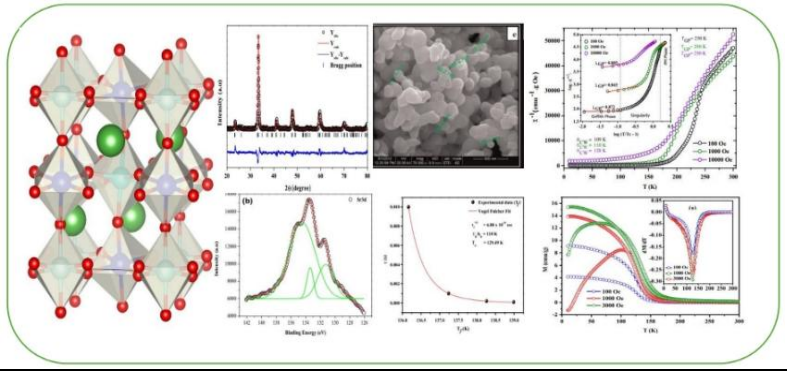
Item	Details
Faculty Name:	Dr. B. Sathyamoorthy
Room No:	Cabin No: 125
Designation:	Assistant Professor
Contact No & E-Mail	+91-9751469434 & sathya-phy@dsu.edu.in
Research Area:	Magnetism and Magnetic Materials, Spintronics, Nanomaterials, Perovskite oxides
Publications	1. **B. Sathyamoorthy**, A. Raja, G. Chandrasekaran, "Field-induced ferromagnetism and enhanced electrical conductivity in sol-gel synthesized $Sm_{0.5}Ca_{0.25}Sr_{0.25}CoO_3$ nanoparticles" Materials Science and Engineering: B, 323, (2026) 118731. (DOI: https://doi.org/10.1016/j.mseb.2025.118731). 2. **B. Sathyamoorthy**, A. Raja, G. Chandrasekaran, "Observation of spin glass ordering and Griffiths-like phase in polycrystalline $Sm_{0.75}Sr_{0.25}CoO_3$ nanoparticles", Journal of Materials Science: Materials in Electronics, 29, (2018) 16338-16347. (DOI: https://doi.org/10.1007/s10854-018-9724-6). 3. **B. Sathyamoorthy**, A. Raja, G. Chandrasekaran, "Observation of magneto-electric coupling in $Sm_{0.5}Sr_{0.5}CoO_3$ nanoparticles", Journal of Materials Science: Materials in Electronics, 29, (2018) 5098-5109. (DOI: https://doi.org/10.1007/s10854-017-8473-2). 4. C. Murugesan, **B. Sathyamoorthy**, G. Chandrasekaran, "Structural, dielectric and magnetic properties of Gd substituted manganese ferrite nanoparticles", Physica Scripta, 90 (2015) 08580 (DOI: 10.1088/0031-8949/90/8/085809). 5. P. Priyadharsini, A. Pradeep, **B. Sathyamoorthy**, G. Chandrasekaran, "Enhanced multiferroic properties in La and Ce co-doped BiFeO3 nanoparticles", Journal of Physics and Chemistry of Solids, 75 (2014) 797-802 (DOI: https://doi.org/10.1016/j.jpcs.2014.03.001). 6. **B. Sathyamoorthy**, P. M. Md Gazzali, C. Murugesan, G. Chandrasekaran, "Electrical properties of samarium cobaltite nanoparticles synthesized using sol-gel autocombustion route", Materials Research Bulletin, 53 (2014) 169-176 (DOI: https://doi.org/10.1016/j.materresbull.2014.02.009)

Sponsored Projects (Past and Ongoing)	❖ **Project title:** Promoting sustainable livelihood through appropriate technological interventions for forest-dependent communities in Sathyamangalam Tiger Reserve, Tamil Nadu. ❖ **PI:** Dr. B. Sathyamoorthy ❖ **Scheme and Sponsored Agency**: Science for Equity Empowerment and Development (SEED) | Department of Science & Technology (DST). ❖ **Sanctioned Amount:** Rs. 54,81,421.00
Profile Links :	❖ Scopus: https://www.scopus.com/authid/detail.uri?authorId=56231866500 ❖ Google Scholar: https://scholar.google.com/citations?user=oFeHRwsAAAAJ&hl=en ❖ ORCID: https://orcid.org/0000-0001-6440-2277 ❖ ResearchGate: https://www.researchgate.net/profile/Sathyamoorthy-B
Research Activities (Write about your best research results max of 2-3 pages including diagrams)	My research focuses on experimental condensed matter physics and investigating the structural, magnetic properties and multifunctional behavior of perovskite oxides, ferrites, and garnets. Through comprehensive characterization and analysis, I aim to elucidate the underlying relationships between crystal structure, magnetism, and functional properties in these materials. Developing perovskite-based materials provide a various application such as cathode material for SOFC's, magnetic devices (sensors, actuators), thermoelectric devices, catalysts and CMR/GMR etc. Nanoparticles of $Sm_{1-x}A_xMO_3$ (A = Sr, Ca; M = Co, Mn) exhibit a wide range of properties, especially the emergence of a Griffiths-like phase, magneto-electric coupling, and spin glass/cluster behavior. The observation of the Griffiths-like phase in perovskite-based systems is a remarkable finding with profound implications for spintronics applications. Moreover, the concurrent presence of magneto-electric coupling and spin glass behavior renders these materials promising candidates for the development of innovative multifunctional materials. This research elucidates the intricate relationships between crystal structure, magnetic properties, and electronic behavior, thereby providing a foundational framework for the development of innovative multifunctional materials. The summery of research undertaken can be described below: ❖ **Field-induced ferromagnetism and enhanced electrical conductivity in sol-gel synthesized $Sm_{0.5}Ca_{0.25}Sr_{0.25}CoO_3$ nanoparticles:** Our work focuses on the synthesis of nanocrystalline $Sm_{0.5}Ca_{0.25}Sr_{0.25}CoO_3$ via the sol–gel auto-combustion route, yielding an orthorhombic perovskite phase with an average crystallite size of ~33 nm. Structural and microstructural

studies revealed porous spherical morphology, while transport and magnetic measurements demonstrated enhanced semiconducting behaviour, significantly improved electrical conductivity (1.10 $S \cdot cm^{-1}$ at 280 K), and field-tunable ferromagnetism through suppression of the Griffiths-like phase. These findings highlight the material's potential for next-generation multifunctional devices in spintronics, sensors, and energy conversion.



- **Observation of Griffiths Phase and Spin Glass behaviour in $Sm_{0.75}Sr_{0.25}CoO_3$**: $Sm_{0.75}Sr_{0.25}CoO_3$ nanoparticles were synthesized via the sol–gel combustion route, forming a single-phase orthorhombic perovskite with an average crystallite size of ~17 nm. Thermal analysis confirmed phase stabilization at ~950 °C, and FESEM imaging revealed spherical particle morphology. Magnetic investigations demonstrated a paramagnetic–ferromagnetic transition with a Curie temperature of ~95 K, low-temperature hysteresis (Hc = 0.38 T), Griffiths-phase-like behavior above $T_(C)$, and spin-glass characteristics confirmed by AC susceptibility. The coexistence of these magnetic states underscores the multifunctional nature of $Sm_{0.75}Sr_{0.25}CoO_3$, making it a promising candidate for advanced colossal magnetoresistance (CMR) applications.



	❖ **Magneto-electric coupling in $Sm_{0.5}Sr_{0.5}CoO_3$:** Nanoparticles of $Sm_{0.5}Sr_{0.5}CoO_3$ (SSC) synthesized via sol-gel method exhibit enhanced electrical conductivity (9.15×10−3 S cm−1). The material undergoes a paramagnetic-ferromagnetic transition, with magnetic anisotropy and squareness ratio values of 35976 (erg/g) and 0.52, respectively, at 10 K. Notably, magneto-electric coupling is observed at T~213 K, and AC magnetic susceptibility confirms spin glass behavior. These findings demonstrate the potential candidate of SSC nanoparticles for applications in magnetoelectric devices and spintronics.
Collaborations	❖ Prof. G. Chandrasekaran, Pondicherry University, Puducherry ❖ Dr. R. Kalai Selvan, Bharathiar University, Coimbatore ❖ Dr. Rajesh Madhu, Research Scientist, Khalifa University, Abu Dabhi, UAE.
Awards and Recognitions	❖ Basic Science Research (BSR) Fellowship (2014-2019) from the University Grants Commission (UGC), Government of India. ❖ Summer Internship Fellowship (2010), Indian Institute of Science (IISc), Bengaluru, India.
Open Positions: If any	❖ Ph.D. positions are available in the area of *Magnetism and Spintronics*. Interested and eligible candidates are invited to send their CV.