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# MECHANICS OF LAYERED MAGNETO-ELECTRIC COMPOSITES

The inherent ability of magneto-electric (ME) composites to show an electrical response under an input magnetic excitation and vice-versa, makes them sought after materials in plethora of applications including sensors, energy harvesters, and biomedical uses. The traditional method of fabrication of ME composite involves the bonding of the constituent magneto-strictive and piezoelectric layers which poses limitations such as aging and poor performance under high temperatures. Thus, a new epoxy-free fabrication method named as press-fit technique has been developed which has been subsequently used to develop a new ME configuration

in the form of Distributed disc structured (DDS) configuration. DDS configurations remarkably increase the ME output under resonant operating condition over the conventional disc/ring structured ME composites. Additionally, a novel thermally stable three-directional ME-based magnetic sensor has been developed using the press-fit technique. Analytical and numerical modeling has been performed to comprehend the influence of magnetic and mechanical attributes to the observed response of such composites.

## ABOUT THE SPEAKER



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Arockiarajan obtained his master's degree (M.E.) from PSG college of Technology and pursued his doctoral Studies (Ph.D.) at University of Kaiserslautern with specialization in computational mechanics. His post doctoral work at University of Nottingham focused on generalized continuum approach for electro-mechanical coupled problems. He has industrial experience with TATA Motors, Pune and Infineon, Germany. He is currently a Professor with the Department of Applied Mechanics, Indian Institute of Technology Madras. His research interest includes smart materials & structures, composites and bio-materials. He is serving as Consultant for various industries. He has over 155 publications in peer review Journals, 6 patent and contributed 5 book chapters. He is an Associate fellow of the Indian National Academy of Engineering. He has received Young Engineer Award from INAE and ISSS Young Scientist Award from Institute for Smart Structures and Systems (ISSS). From his Institute, he has received Young Faculty Recognition Award and Institute Research Development Award.