1.	Record Nr.	UNINA9910299603003321
	Autore	Rafique Sajid
	Titolo	Piezoelectric Vibration Energy Harvesting : Modeling & Experiments / / by Sajid Rafique
	Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2018
	ISBN	3-319-69442-1
	Edizione	[1st ed. 2018.]
	Descrizione fisica	1 online resource (XVIII, 172 p. 87 illus., 41 illus. in color.)
	Disciplina	621.042
	Soggetti	Energy harvesting
		Optical materials
		Electronics - Materials
		Energy systems
		Energy Harvesting
		Optical and Electronic Materials
		Energy Systems
	Lingua di pubblicazione	Inglese
	Formato	Materiale a stampa
	Livello bibliografico	Monografia
	Nota di bibliografia	Includes bibliographical references at the end of each chapters and index.
	Nota di contenuto	Introduction -- Overview of Vibration Energy Harvesting -- Distributed Parameter Modeling and Experimental Validation -- Modeling of Energy Harvesting Beams using Dynamic Stiffness Method -- A Theoretical Analysis of an "Electromechanical" Beam Tuned Mass Damper -- Experimental Analysis of an "Electromechanical" Beam Tuned Mass Damper -- Example of Vibration Suppression of Electronic Box Using Dual Function EH/TVA -- Summary and Future Research.
	Sommario/riassunto	The electromechanical coupling effect introduced by piezoelectric vibration energy harvesting (PVEH) presents serious modeling challenges. This book provides close-form accurate mathematical modeling and experimental techniques to design and validate dual function PVEH vibration absorbing devices as a solution to mitigate vibration and maximize operational efficiency. It includes in-depth experimental validation of a PVEH beam model based on the analytical modal analysis method (AMAM), precisely identifying electrical loads

that harvest maximum power and induce maximum electrical damping. The author's detailed analysis will be useful for researchers working in the rapidly emerging field of vibration based energy harvesting, as well as for students investigating electromechanical devices, piezoelectric sensors and actuators, and vibration control engineering. Includes a thorough theoretical and experimental analysis of a PVEH beam or assembly of beams; Provides an in-depth investigation of a dual function piezoelectric vibration energy harvester beam/tuned vibration absorber (PVEH/TVA) or "electromechanical TVA"; Outlines the electromechanical TVA's potential application to dual-function energy harvesting and vibration control; Establishes a procedure for the exact modeling of PVEH beams, and assemblies of such beams, using the dynamic stiffness matrix (DSM) method. The book contains useful MatLab program codes which model complex equations, providing a deeper and quicker insight of the PVEH as well as the dual function PVEH/TVA systems.