FOREWORD

Special Section on Energy Localization and Waves in Nonlinear Lattices — Memorial Issue Dedicated to Professor Shozo Takeno —

Major advances in the theory of nonlinear excitations in discrete lattices occurred in the late 1980’s and early 1990’s and Professor Shozo Takeno was a key contributor. The discovery that some localized vibrations in perfectly periodic but strongly anharmonic lattices can be stabilized by the discreteness in a lattice of any dimension proved to be a conceptual and practical break though. Shozo called these localized excitations “intrinsic localized modes” (ILMs) emphasizing the fact that their formation involved no static disorder, in contrast to defect-induced localized modes, which had been studied for many decades. More recently these localized excitations also have been called “discrete breathers” (DBs) to emphasize their similarity to exact breather soliton solutions in nonlinear continuum theories. Such localized excitations have been observed in macroscopic arrays as diverse as coupled Josephson junctions, optical waveguides, two dimensional nonlinear photonic crystals, and micromechanical cantilevers. In solids ILMs have been observed for spin waves and also for vibrational excitations. So far in most experiments the system has been driven far from equilibrium. In this special section on Energy Localization and Waves in Nonlinear Lattices dedicated to Professor Shozo Takeno we present a small sampling of recent thrusts in this expanding field. The guest editor in chief would like to express his sincere thanks to the authors for their contributions. He also thanks the reviewers and the members of the guest editorial Committee, especially Dr. Y. Doi; the secretary of the special section, Dr. M. Kimura; and the editorial staff of the NOLTA Journal for their support in publishing this Special Section.

Albert J. Sievers
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