Symmetry in Nature: Discreteness, Three-Dimensional Extension and Minimum Potential Energy

HÉCTOR A. MÚNERA

Centro Internacional de Física (CIF) (International Centre for Physics)
Apartado aéreo 4948
Bogotá D.C., Colombia
hmunera@hotmail.com

Abstract. At every scale of Nature symmetry manifests in a variety of ways, leading over the centuries to apparently disjoint descriptions, from Platonic solids, through Fibonacci numbers, to charge, parity, and time invariance. It is claimed that discreteness, three-dimensional extension, and minimization of potential energy may be the common basic principles leading to observed symmetries. The author found (Nature 1986) that punctual N discrete masses array on the surface and inside a sphere in highly symmetrical configurations exhibiting tangential equilibrium and low potential energy in an inverse potential field. Present paper adds new boundary conditions arising from the three-dimensional extension of the discrete masses, and from the rotational motion of the symmetrical N-particle arrays ($1 < N < 21$).