

INTERNATIONAL AWARD
“CATALDO AGOSTINELLI E ANGIOLA GILI AGOSTINELLI”

(Deadline December 31 2012 – Prize of € 15,000)

Report for the award of the International “Cataldo Agostinelli and Angiola Gili Agostinelli” for 2013, intended for an eminent scholar, Italian or foreign, of pure or applied Mechanics or mathematical Physics. Commission: SALVATORE RIONERO (Chairman), GIOVANNI JONALASINIO, GIOVANNI SEMINARA (Rapporteur).

Philip J. MORRISON is a Full Professor in the Department of Physics and Institute for Fusion Studies of the University of Texas at Austin.

The scientific production of Morrison, consisting of more than 150 papers in international journals, touches on a variety of issues pertaining to the dynamics of nonlinear non-dissipative systems, both fundamental issues and issues of relevance to application in Fluid Mechanics and Physics of Plasmas.

His production is of indubitable scientific relevance. Morrison is an international leader in research related to nonlinear Hamiltonian systems and the stability of nondissipative plasmas. Considerable interest (witnessed by a huge number of citations) received in particular for the discovery of the noncanonical Hamiltonian structure of the equations that govern the mechanics of ideal fluids and non-dissipative plasmas. Of great interest are his following contributions: the statistical theory of turbulence called *spectral reduction*, which does not make use of closures for the modeling of triple correlations but reduces to a manageable number of degrees of freedom; the solution of the linearized Euler equations in terms of a new integral transform, which allows the study of the dynamics of continuous spectra; and the study of chaotic transport in quasi-geostrophic motions.

Much of the work of Morrison is relevant to application: coming to mind is the enormous potential opened in the field of numerical modeling of turbulence. Morrison has in fact also dedicated attention to the problems of numerical modeling, helping to develop algorithms suitable for conservative systems that overcome the inability of traditional algorithms to preserve nonlinear invariants.

Philip J. MORRISON has been an invited speaker at a large number of important International Conventions; in particular, in 1981, 1986, 1993, 2000, 2002 and 2004 at Meetings of the American Physical Society, of which he has been a Fellow since 1992. He has taught at numerous prestigious Summer Schools, including the Geophysical Fluid Dynamics program in Woods Hole and a program in theoretical physics in La Jolla, and he has inspired a circle of scholars who have gathered around his teaching.

Report approved at Assembly of Classes (Accademia Nazionale dei Lincei) meeting May 10, 2013.