



Advances in Mathematical Physics

Special Issue on Temporal Aspects of Wave Dynamics in Quantum and Classical Physics

CALL FOR PAPERS

Adequate mathematical modeling of the temporal aspects of classical and quantum wave dynamics is interdisciplinary problem which combines mathematical physics with quantum mechanics, classical electrodynamics, and other topics of classical physics dealing with the propagation of waves of different nature.

Longstanding debates around this problem show that there is necessity in new mathematical models of timekeeping procedures for classical and quantum wave dynamics, which would not only be internally consistent but also meet requirements of the causality principle. There are reasons to believe that the root of many paradoxical properties that appear at present in solving this problem is common for quantum and classical wave dynamics. For example, in studying the temporal aspects of scattering a quantum particle on a one-dimensional potential barrier, as well as scattering the light and sound pulses in layered structures, researchers face in fact the same problems. When the corresponding wave packets are partitioned, in the course of scattering, into two or more parts, the well-known Hartman paradox appears irrespective of the nature of waves. So far there is no consensus among researchers with respect to the origin of this paradox and the ways of its solving. At the same time, in recent years, the debate on this issue almost disappeared. Thus, there is urgent necessity in reviving these debates and searching for new approaches for solving the old problem.

This special issue implies high quality theoretical and original research articles as well as review articles on the temporal aspects of wave dynamics in quantum and classical physics.

Potential topics include, but are not limited to:

- ▶ On the status of time in quantum mechanics
- ▶ Collision time in nuclear physics
- ▶ Temporal aspects of dynamics of the spinning electron in relativistic quantum mechanics and quantum field theory
- ▶ Tunneling and reflection time in physics of scattering a quantum particle on one-dimensional potential barriers
- ▶ Temporal aspects of a light propagation through layered structures
- ▶ On the temporal aspects of propagation of sound waves in layered structures
- ▶ On the nature of the Hartman effect in quantum and classical physics

Authors can submit their manuscripts via the Manuscript Tracking System at <http://mts.hindawi.com/submit/journals/amp/tctp/>.

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