

Preface

August 8, 1991 was the 60th birthday of Roger Penrose. This event took most of his friends and colleagues by surprise, and the idea of this special issue therefore arose very late. The fact that the publication of the issue required so little time is a tribute to the strong commitment of the contributors to commemorate this event.

It was very instructive for me to read in the papers of this collection about the strong and varied influence of Roger on the authors. It is clear today that he is one of the most remarkable scientists of our time. We want to emphasize that his ideas are usually not only deep and important, but unexpected. His work on quasi-crystals and aperiodic tiles is a good example.

Among Roger Penrose's achievements, the twistor theory is closest to our personal interests. I remember that his idea to interpret the points of space-time as lines in a complex projective space seemed fantastic at the time. Roger gave the expressive title "Complex Geometry of the Real World" to his address at the International Congress of Mathematicians in Helsinki (1978). There were soon several important applications: explicit solutions of the self-dual Einstein equation (nonlinear gravitons), and instantons for the Yang-Mills equation. Twistors had also deep connections with the classical constructions of Plücker and Radon, and opened new possibilities for such modern subjects as vector bundles on projective spaces and $\bar{\partial}$ -cohomology. We strongly recommend reading Roger's description of his surprising route to twistors in his paper "On the origins of twistor theory" [Gravitation and Geometry (Bibliopolis, Naples, 1987) pp. 341-361].

His work on mathematical physics represents only one side of Roger Penrose's scientific activity. Others include reflections about philosophical problems of physics, and about problems of brain function. He is ready to discuss such problems with a broad public, as shown by his remarkable recent book "The Emperor's New Mind".

Roger demonstrates how young and active one can be at 60. We await many new surprises from him.

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