Janis, Allen I. (ed.); **Porter, John R. (ed.)**
Recent advances in general relativity. Essays in honor of Ted Newman. (English)
Zbl 0840.53076
Einstein Studies. 4. Boston, MA: Birkhäuser Verlag. xi, 266 p. (1992).

[The articles of this volume will not be indexed individually.]

These proceedings of the 1990 Pittsburgh Conference are a tribute to Ted Newman. Some essays recall ideas and mathematical techniques due to him, and their developments, while others concentrate on recent advances in a few problems in general relativity. Gravitational radiation and quantum gravity are those stressed in the opening lecture (Bergmann). The analysis of the asymptotic symmetry group of future null infinity, the Bondi-Metzner-Sachs group, led him with an appropriate complexification, to H-space and the eth operator; the connections of the former with twistor theory are recalled (Penrose) and the Newman-Penrose formalism with a tetrad of non-commutative operators is constructed, as an application of the second (Sparling). Newman's cut function is related to the Blaschke support function for a convex surface and leads to a version of the fuzzy point idea in Minkowski spacetime (Tod). The study of the asymptotic structure of spacetime adapted to "isolated" gravitating systems using the technique of the conformal extension of Minkowski spacetime is reviewed and contrasted with recent advances (Friederich). Holonomy variables introduced by Newman and Koznameh are recognized as basic in the loop quantization and their application to nonperturbative quantum gravity is discussed (Rovelli). The Kerr-Newman black hole furnishes the occasion for reviewing recent progress regarding the limitations of the "no hair" paradigm and the study of black hole interior; the latter seems to favour a bouncing universe starting from a baby universe (Israel). A few recent results concerning neutron stars (relation between maximum rotation and equation of state, possibility of quark core etc.) are outlined (J. L. Friedman). Prospects for the detection of gravitational waves (Thorne) are considered along with conflicting views on the cross-sections of resonant-bar gravitational wave detectors and on their agreement with calibrations (Weber, Thorne). The one-dimensional reductions of self-dual Yang-Mills equations (Ablowitz and Chakravarty) and self-dual classical gravity are discussed. One also finds summaries of workshops on classical and quantum gravity (Tod, Kuchar).

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MSC:

53Z05	Applications of differential geometry to physics	
83-06	Proceedings, conferences, collections, etc. pertaining to relativity and gravitational theory	
00B25	Proceedings of conferences of miscellaneous specific interest	
83C30	Asymptotic procedures (radiation, news functions, $\mathcal{H}$-spaces, etc.) in general relativity and gravitational theory	
83C35	Gravitational waves	
83C45	Quantization of the gravitational field	
83C57	Black holes	
83C60	Spinor and twistor methods in general relativity and gravitational theory; Newman-Penrose formalism	

Cited in **1** Document

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Proceedings; General relativity; Pittsburgh/USA; proceedings; 1990 Pittsburgh Conference; Ted Newman; general relativity; quantum gravity

Biographic references:

Newman, Ted