



ACADÉMIE
DES SCIENCES
INSTITUT DE FRANCE

Comptes Rendus

Mécanique

Jérémie Szeftel

Foreword to the special issue “Recent advances in general relativity: an issue in memory of Yvonne Choquet-Bruhat”

Volume 353 (2025), p. 477-478

Online since: 7 March 2025

<https://doi.org/10.5802/crmeca.289>



This article is licensed under the
CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENSE.
<http://creativecommons.org/licenses/by/4.0/>



*The Comptes Rendus. Mécanique are a member of the
Mersenne Center for open scientific publishing*
www.centre-mersenne.org — e-ISSN : 1873-7234

Foreword / *Avant-propos*

Foreword to the special issue “Recent advances in general relativity: an issue in memory of Yvonne Choquet-Bruhat”

Avant-propos du numéro spécial « Avancées récentes dans le domaine de la relativité générale : numéro en l'honneur d'Yvonne Choquet-Bruhat »

Jérémie Szeftel ^a

^a CNRS & Laboratoire Jacques-Louis Lions, Sorbonne université, France

E-mail: jeremie.szeftel@sorbonne-universite.fr



Yvonne Choquet-Bruhat (Photo credit: Geneviève Choquet)

The present volume is dedicated to the memory of Yvonne Choquet-Bruhat who recently passed away at 101 years old. She was the first woman elected at the French Academy of Sciences and a remarkable mathematician. She pioneered the field of mathematical general relativity with her seminal 1952 paper [1] on the local solvability of the Einstein equations. Her subsequent influential works on the constraint equations and on the evolution problem have left a deep impact on both theoretical and numerical developments. Her textbook [2] is widely viewed as a classical reference on the subject and an invaluable source of fruitful research directions. For more on the work of Yvonne Choquet-Bruhat, we refer the reader to the text “On Yvonne”

written by Piotr Chruściel in her honor for this special issue. We also recommend her memoirs [3] for the witty account of a woman mathematician at a time where they were very few.

The volume consists of a collection of reviews on various aspects of general relativity from a mathematical perspective, many of them originating from the work of Yvonne Choquet-Bruhat. The following topics are covered:

- (1) “A survey on the positive mass theorem for asymptotically flat initial data sets” by Lan-Hsuan Huang
- (2) “Gluing for the Einstein constraint equations” by Justin Corvino
- (3) “The stability of Minkowski space and its influence on the mathematical analysis of general relativity” by Jacques Smulevici
- (4) “The black hole stability problem” by Sergiu Klainerman
- (5) “On the regularity problems of the Einstein equations” by Qian Wang
- (6) “Weak Cosmic Censorship, trapped surfaces, and naked singularities for the Einstein vacuum equations” by Yakov Shlapentokh-Rothman
- (7) “The Strong Cosmic Censorship conjecture” by Maxime Van de Moortel
- (8) “Cosmology, the Big Bang and the BKL conjecture” by Hans Ringström
- (9) “Burnett’s conjecture in general relativity” by Arthur Touati
- (10) “Some aspects of spectral and microlocal methods in general relativity” by Dietrich Häfner.

We hope that these surveys will allow the reader to gain insights into the latest developments of the field, as well as to appreciate the tremendous achievements that have been obtained along the way, starting with the pioneering contributions of Yvonne Choquet-Bruhat.

References

- [1] Y. Fourès-Bruhat, “Théorème d’existence pour certains systèmes d’équations aux dérivées partielles non linéaires”, *Acta Math.* **88** (1952), pp. 141–225.
- [2] Y. Choquet-Bruhat, *General Relativity and the Einstein Equations*, Oxford Mathematical Monographs, Oxford University Press: Oxford, New York, 2009.
- [3] Y. Choquet-Bruhat, *Une mathématicienne dans cet étrange univers*, Odile Jacob: Paris, 2016.