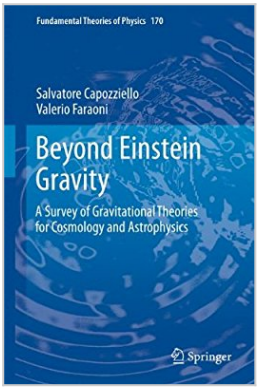

Beyond Einstein Gravity: A Survey of Gravitational Theories for Cosmology and Astrophysics (Fundamental Theories of Physics)

By Salvatore Capozziello, Valerio Faraoni

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Beyond Einstein's Gravity is a graduate level introduction to extended theories of gravity and cosmology, including variational principles, the weak-field limit, gravitational waves, mathematical tools, exact solutions, as well as cosmological and astrophysical applications. The book provides a critical overview of the research in this area and unifies the existing literature using a consistent notation. Although the results apply in principle to all alternative gravities, a special emphasis is on scalar-tensor and f(R) theories. They were studied by theoretical physicists from early on, and in the 1980s they appeared in attempts to renormalize General Relativity and in models of the early universe. Recently, these theories have seen a new lease of life, in both their metric and metric-affine versions, as models of the present acceleration of the universe without introducing the mysterious and exotic dark energy. The dark matter problem can also be addressed in extended gravity. These applications are contributing to a deeper understanding of the gravitational interaction from both the theoretical and the experimental point of view. An extensive bibliography guides the reader into more detailed literature on particular topics.

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Editorial Review

Review

From the reviews:

“This monograph covers almost all extended theories of gravity which are under current discussion and their application to cosmology. It is a useful guide through the literature on these topics, and the reference list covers as many as 1180 items, mainly from the recent ten years. The authors themselves are active researchers in this field, and so they are able to present the material with competence, especially, they often give the key equations and explain the problematic points.” (Hans-J*ü*rgen Schmidt, Zentralblatt MATH, Vol. 1206, 2011)

From the Back Cover
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About the Author
Valerio Faraoni received a PhD in Astrophysics at the International School for Advanced Studies in Trieste, Italy. He is known for his research on alternative theories of gravity, cosmology, and gravitational waves. He is currently Associate Professor at Bishop's University in Sherbrooke, Canada. Salvatore Capozziello graduated in Physics at University of Rome "La Sapienza" and received a PhD in Theoretical Physics at University of Naples "Federico II", Italy. He is the author of almost 300 hundred papers and monographs including theory of gravity, gravitational waves, theoretical and observational cosmology. He is currently Associate Professor at the University of Naples "Federico II", Italy.

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