

## PREFACE

This book is written for those who are interested in the large-scale structure of the Universe, whether they are relativists, cosmologists, astronomers or just physicists. It summarizes the research and results of the cosmological special relativity as well as the cosmological general relativity. The cosmological special relativity is presented along the lines of Einstein's special relativity and it is needed even though we know that the cosmos is actually filled up with gravity.

Its generalization to a full theory of gravitation, cosmological general relativity, in four dimensions of space and velocity is then followed up. These theories make new predictions that are not included in Einstein's special and general theories of relativity. This fact is not an indication that anything is wrong with Einstein's theories. On the contrary, Einstein's theories have been very successful in cosmology and in local (Lorentz) invariance that have led physics to one of its greatest achievements.

Cosmological general relativity is then extended to five dimensions so as to have spacetime and velocity. Cosmological general relativity does not have, neither it needs, a cosmological constant. It was also shown by Dr John G. Hartnett that there is no need to assume the existence of dark matter in the Universe (Intern. J. Theor. Phys. **44** (3), 359–372 and **44** (4), 485–492 (2005)). It also means there is no need to the assumption of dark matter in the halos of rotating and spiral galaxies. Among other results, the theory shows that the Universe is expanding

with an acceleration with a positive pressure (and not negative as in other theories). Likewise, the Big Bang time in this theory is equal to  $13.56 \pm 0.48$  Gyr, in agreement with the recent results obtained by NASA's WMAP according to which initial cosmic inflation occurred  $13.7 \pm 0.2$  Gyr ago.

The book is written in a clear and pedagogical way so as to enable the non-experts as well as experts to easily understand its content. We have tried to use as few formulas as possible to the extent that the text will still be accurate.

It is a pleasure to thank Dr Julia Goldbaum for her great help, in both the scientific and the technical contents, in writing this book. It is also a great pleasure to thank Dr John G. Hartnett, University of Western Australia, and Dr Firmin J. Oliveira, Institute of Space Research, Hawaii, for their great contributions to the understanding and the expanding of the theories presented in this book.

*Beer Sheva, Israel  
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