

Preface

This book is based on the lecture notes of the course on black hole astrophysics given at the University of La Plata, Argentina, by one of us (GER). The material aims at advanced undergraduate and graduate students with interest in astrophysics. The course takes one semester and is usually complemented by a course on high-energy astrophysics. The material included goes beyond what is found in classic textbooks like that by Shapiro and Teukolsky and is focused exclusively on black holes. We do not consider applications to other compact objects, such as neutron stars and white dwarfs. Instead, we provide more details on astrophysical manifestations of black holes. In particular, we include abundant material on jet physics and accounts of objects such as microquasars, active galactic nuclei, gamma-ray bursts, and ultraluminous X-ray sources. Other topics, normally not covered in introductory texts, like black holes in alternative theories of gravity, are discussed since we have found that they are highly stimulating for the students. Obviously, in a book of this kind, completeness is not possible, and some selection criterion must be applied to the material. Ours has been quite personal: we selected the topics on which GER has been working for around 20 years now, and we think that these topics form the core and starting point for basic research in this fascinating area of astrophysics.

In writing the book, we tried to avoid unnecessary technicalities, and to some degree the book is self-contained. Some previous knowledge of General Relativity would be desirable, but the reader will find the basic tools in Chap. 1. The appendices provide some additional mathematical details that will be useful to pursue the study and a guide to the bibliography on the subject.

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