

Deep within galaxies like the Milky Way, astronomers have found a fascinating legacy of Einstein's general theory of relativity: supermassive black holes. Connected to the evolution of the galaxies that contain these black holes, galactic nuclei are the sites of uniquely energetic events, including quasars, stellar tidal disruptions, and the generation of gravitational waves. This textbook is the first comprehensive introduction to dynamical processes occurring in the vicinity of supermassive black holes in their galactic environment. Filling a critical gap, it is an authoritative resource for astrophysics and physics graduate students, and researchers focusing on galactic nuclei, the astrophysics of massive black holes, galactic dynamics, and gravitational wave detection. It is an ideal text for an advanced graduate-level course on galactic nuclei and as supplementary reading in graduate-level courses on high-energy astrophysics and galactic dynamics.

David Merritt summarizes the theoretical work of the last three decades on the evolution of galactic nuclei, the formation of massive black holes, and the interaction between black holes and stars. He explores in depth such important topics as observations of galactic nuclei, dynamical models, weighing black holes, motion near supermassive black holes, evolution of nuclei due to gravitational encounters, loss cone theory, and binary supermassive black holes. Self-contained and up-to-date, the textbook includes a summary of the current literature and previously unpublished work by the author.

For researchers working on active galactic nuclei, galaxy evolution, and the generation of gravitational waves, this book will be an essential resource.

"This direct, clear, and authoritative book shows Merritt's extensive experience with the techniques needed to understand the motions of stars in galaxies. It will be used as a reference by those who interpret the observations of stellar motions in galactic nuclei and will serve as a basis for further theoretical work."

—Tim de Zeeuw, European Southern Observatory

"A leading expert on the dynamics of galactic nuclei, and of stars near massive black holes, Merritt has led many of the advances in our understanding of these systems. His very timely book fills a large gap in the literature of stellar dynamics and covers all the material that is required to embark on research in this field."

—Tal Alexander, Weizmann Institute of Science

"Merritt is one of the most highly regarded astrophysical dynamicists in the field. Excellent, complete, and well-balanced, *Dynamics and Evolution of Galactic Nuclei* reflects his rigorous work."

—Bradley Peterson, Ohio State University

David Merritt is professor of physics at the Rochester Institute of Technology.

PRINCETON SERIES IN ASTROPHYSICS

David N. Spergel, Series Editor

Jacket Photograph: Centaurus A (NGC 5128) is the closest active galaxy to the Earth. This galaxy appears to be the result of a collision between two otherwise normal galaxies; near the galaxy's center, cosmic debris is being consumed by a central, supermassive black hole. Courtesy of Dr Tim Carruthers, Cairns, Australia

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Preface	ix
Chapter 1 INTRODUCTION AND HISTORICAL OVERVIEW	1
Chapter 2 OBSERVATIONS OF GALACTIC NUCLEI AND SUPERMASSIVE BLACK HOLES	11
2.1 Structure of galaxies and galactic nuclei	11
2.2 Techniques for weighing black holes	18
2.3 Supermassive black holes in the Local Group	29
2.4 Phenomenology	33
2.5 Evidence for intermediate-mass black holes	45
2.6 Evidence for binary and multiple supermassive black holes	47
2.7 Gravitational waves	52
Chapter 3 COLLISIONLESS EQUILIBRIA	57
3.1 Orbits, integrals, and steady states	59
3.2 Spherical nuclei	72
3.3 The adiabatic growth model	90
3.4 Axisymmetric nuclei	93
3.5 Triaxial nuclei	100
Chapter 4 MOTION NEAR SUPERMASSIVE BLACK HOLES	117
4.1 Keplerian orbits	120
4.2 Perturbed orbits	125
4.3 The post-Newtonian approximation	131
4.4 Newtonian perturbations	135
4.5 Relativistic orbits	157
4.6 Capture	176
4.7 Relativistic motion in the presence of a distributed mass	183
4.8 Motion in the presence of a second massive body	192
4.9 Stellar motions at the center of the Milky Way	203
Chapter 5 THEORY OF GRAVITATIONAL ENCOUNTERS	213
5.1 Basic concepts and time of relaxation	213
5.2 Diffusion coefficients	216

5.3	Fokker–Planck equation	236
5.4	Gravitational Brownian motion	246
5.5	Orbit-averaged Fokker–Planck equation	251
5.6	Gravitational encounters near a supermassive black hole	264
5.7	Encounters with a spinning supermassive black hole	277
Chapter 6	LOSS-CONE DYNAMICS	289
6.1	Spherical symmetry	297
6.2	Nonspherical nuclei	326
6.3	Binary and hypervelocity stars	341
6.4	Relativistic loss cones and extreme-mass-ratio inspirals	350
Chapter 7	COLLISIONAL EVOLUTION OF NUCLEI	361
7.1	Evolution of the stellar distribution around a supermassive black hole	366
7.2	Cusp (re)generation	383
7.3	Black-hole-driven expansion	390
7.4	Massive perturbers	391
7.5	Evolution of nuclei lacking massive black holes	395
Chapter 8	BINARY AND MULTIPLE SUPERMASSIVE BLACK HOLES	415
8.1	Interaction of a massive binary with field stars	417
8.2	Massive binary at the center of a galaxy: I. Early evolution	432
8.3	Massive binary at the center of a galaxy: II. Late evolution	446
8.4	Interaction of binary supermassive black holes with gas	462
8.5	Simulations of galaxy mergers	467
8.6	Dynamics of intermediate-mass black holes	468
8.7	Triple supermassive black holes and the final-parsec problem	483
Suggestions for Further Reading		489
References		493
Index		535