



gravity, branes and strings, to more concrete relativistic astrophysics observations and modeling. The three volumes of the proceedings of MG13 give a broad view of all aspects of gravitational physics and astrophysics, from mathematical issues to recent observations and experiments. The scientific program of the meeting included 33 morning plenary talks during 6 days, and 75 parallel sessions over 4 afternoons. Volume A contains plenary and review talks ranging from the mathematical foundations of classical and quantum gravitational theories including recent developments in string/brane theories, to precision tests of general relativity including progress towards the detection of gravitational waves, and from supernova cosmology to relativistic astrophysics including such topics as gamma ray bursts, black hole physics both in our galaxy and in active galactic nuclei in other galaxies, and neutron star and pulsar astrophysics. Volumes B and C include parallel sessions which touch on dark matter, neutrinos, X-ray sources, astrophysical black holes, neutron stars, binary systems, radiative transfer, accretion disks, quasars, gamma ray bursts, supernovas, alternative gravitational theories, perturbations of collapsed objects, analog models, black hole thermodynamics, numerical relativity, gravitational lensing, large scale structure, observational cosmology, early universe models and cosmic microwave background anisotropies, inhomogeneous cosmology, inflation, global structure, singularities, chaos, Einstein–Maxwell systems, wormholes, exact solutions of Einstein's equations, gravitational waves, gravitational wave detectors and data analysis, precision gravitational measurements, quantum gravity and loop quantum gravity, quantum cosmology, strings and branes, self-gravitating systems, gamma ray astronomy, and cosmic rays and the history of general relativity. Contents: On the Cosmological Singularity (Vladimir A Belinski) GRB Afterglow Discovery with BeppoSAX: Its Story 15 Years Later (Filippo Frontera) Rotation, Convection, and Core Collapse (W David Arnett) Spacetime Singularities: Recent Developments (Claes Uggla) Hidden Symmetries: From BKL to Kac–Moody (Philipp Fleig & Hermann Nicolai) Recent Results in Mathematical GR (Sergiu Klainerman) Higher Dimensional Black Holes (Harvey S Reall) Causal Dynamical Triangulations and the Search for a Theory of Quantum Gravity (Jan Ambjorn, Andrzej Görlich, Jerzy Jurkiewicz & Renate Loll) On Quantum Gravity, Asymptotic Safety, and Paramagnetic Dominance (Andreas Nink & Martin Reuter) Perturbative Quantum Gravity as a Double Copy of Gauge Theory and Implications for UV Properties (Zvi Bern) Type Ia Supernova Cosmology: Past and Future (Ariel Goobar) The Energetic Universe: A Nobel Surprise (Robert P Kirshner) Strong, Weak, Electromagnetic and Gravitational Interactions in Neutron Stars (Jorge Rueda & Remo Ruffini) Gravitational-Wave Physics and Astronomy Using Ground-Based Interferometers (David H Reitze & David H Shoemaker) Gamma-Ray Burst Prompt Emission (Bing Zhang) Black Holes, Supernovae and Gamma Ray Bursts (Remo Ruffini) Precision Tests of Theories of Gravity Using Pulsars (Michael Kramer) The Planck Mission: Recent Results, Cosmological and Fundamental Physics Perspectives (Nazzareno Mandolesi, Carlo Burigana, Alessandro Gruppuso & Paolo Natoli) Observation of a New Boson at a Mass of 125 GeV with the CMS Experiment at the LHC (Chiara Mariotti) Unavoidable CMB Spectral Features and Blackbody Photosphere of Our Universe (Rashid Sunyaev & Rishi Khatri) Search for the Standard Model Higgs Boson with the ATLAS Detector (Domizia Orestano) Readership: Graduate students in astronomy, astrophysics and cosmology, and scientists interested in general relativity, gravitation, astrophysics, quantum gravity, particle physics, cosmology and theoretical physics. Keywords: General Relativity; Gravitation; Astrophysics; Quantum Gravity; Particle Physics; Cosmology; Theoretical Physics

This book discusses the state of the art of the basic theoretical and observational topics related to black hole astrophysics. It covers all the main topics in this wide field, from the theory of accretion disks and formation mechanisms of jet and outflows, to their observed electromagnetic spectrum, and attempts to measure the spin of these objects. Black holes are one of the most fascinating predictions of general relativity and are currently a very hot topic in both physics and astrophysics. In the last five years there have been significant advances in our understanding of these systems, and in the next five years it should become possible to use them to test fundamental physics, in particular to predict the general relativity in the strong field regime. The book is both a reference work for researchers and a textbook for graduate students.

Astrophysics in a Nutshell Solutions Manual 2e Solutions Manual to Astrophysics in a Nutshell Astrophysics in a Nutshell Second Edition Princeton University Press

The essential primer for physics students who want to build their physical intuition Presented in A. Zee's incomparably engaging style, this book introduces physics students to the practice of using physical reasoning and judicious guesses to get at the crux of a problem. An essential primer for advanced undergraduates and beyond, *Fly by Night Physics* reveals the simple and effective techniques that researchers use to think through a problem to its solution—or failing that, to smartly guess the answer—before starting any calculations. In typical physics classrooms, students seek to master an enormous toolbox of mathematical methods, which are necessary to do the precise calculations used in physics. Consequently, students often develop the unfortunate impression that physics consists of well-defined problems that can be solved with tightly reasoned and logical steps. Idealized textbook exercises and homework problems reinforce this erroneous impression. As a result, even the best students can find themselves completely unprepared for the challenges of doing actual research. In reality, physics is replete with back-of-the-envelope estimates, order-of-magnitude guesses, and fly-by-night leaps of logic. Including exciting problems related to cutting-edge topics in physics, from Hawking radiation to gravity waves, this indispensable book will help students more deeply understand the equations they have learned and develop the confidence to start flying by night to arrive at the answers they seek. For instructors, a solutions manual is available upon request.

The ideal one-semester astrophysics introduction for science undergraduates—now expanded and fully updated Winner of the American Astronomical Society's Chambliss Award, *Astrophysics in a Nutshell* has become the text of choice in astrophysics courses for science majors at top universities in North America and beyond. In this expanded and fully updated second edition, the book gets even better, with a new chapter on extrasolar planets; a greatly expanded chapter on the interstellar medium; fully updated facts and figures on all subjects, from the observed properties of white dwarfs to the latest results from precision cosmology; and additional instructive problem sets. Throughout, the text features the same focused, concise style and emphasis on physics intuition that have made the book a favorite of students and teachers. Written by Dan Maoz, a leading active researcher, and designed for advanced undergraduate science majors, *Astrophysics in a Nutshell* is a brief but thorough introduction to the observational data and theoretical concepts underlying modern astronomy. Generously illustrated, it covers the essentials of modern astrophysics, emphasizing the common physical principles that govern astronomical phenomena, and the interplay between theory and observation, while also introducing subjects at the forefront of modern research, including black holes, dark matter, dark energy, and gravitational lensing. In addition to serving as a course textbook, *Astrophysics in a Nutshell* is an ideal review for a qualifying exam and a handy reference for teachers and researchers. The most concise and current astrophysics

