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BOOK REVIEW

Equation of Motion in General Relativity, by Hideki Asada, Toshifumi Futamase and Peter A. Hogan, Oxford University Press, Oxford 2011, x + 153 pages, ISBN-978-0-19958-410-9.

The book offers an almost complete guide for the study of the motion of extended bodies and the motion of small black holes in external gravitational and electromagnetic fields. The equations of motion are derived in the post Newtonian approximation in which the strong internal gravity of bodies is taken into account. For small black holes the equations of motion are derived from Einstein field equations requiring that the wave fronts of the produced radiation are smoothly deformed spheres near the black hole. Advance of periastron, light deflection, Shapiro time delay, orbital period decay and spin precession are described in detail and the book ends with a discussion of few-body system both in Newtonian and Einstein gravity.

The book architecture consists of an Introduction, six chapters and four Appendices.

In the *Introduction*, the readers are provided with an historical description of the field, supported by a detailed list of references ranging from the seminal paper by Einstein, Infeld and Hoffmann (1938) to the most recent results stressing their relevance for the ongoing interferometric gravitational wave experiments. The authors also discuss the approach chosen to present the equation of motion of small black holes.

The first three chapters concern the motion of extended bodies in General Relativity.

The chapter *Foundation of the Post-Newtonian Approximation* is devoted to an introduction of the basic notion presented in the book. Starting from a general definition of asymptotic approximation of a theory, the authors define the Newtonian, Post-Newtonian and higher approximation of various quantities. A concrete example in harmonic coordinates is presented. The strong field point particle limit, the surface integral approach to the evaluation of the equations of motion are then presented and the scaling of the initial data is discussed. The Newtonian equations of