

sor form are derived. Next is a discussion, based on a variational principle, of spacetime geodesics. With those concepts in hand, the reader is already capable of diving into the next eight chapters and understanding the most important physical properties of the Schwarzschild metric. Those chapters include a nice discussion on particle and photon orbits and their applications to the perihelion precession of Mercury and gravitational lensing, a demonstration that the Schwarzschild metric describes a black hole, and some heuristic comments on black hole thermodynamics.

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A novel aspect of *A General Relativity Workbook* is its overview-and-box layout: Each chapter contains a clear motivation, an overview of the key concepts and results, a box section that guides the reader through the derivation of the details and includes space for calculation, and homework problems.

At a few spots in the book, the discussion has been oversimplified. For example, the introduction of the "absolute gradient," more commonly known as the covariant derivative, and the central role it plays in the mathematical realization of the equivalence principle is not rigorous. A student or scientist wishing to acquire a more thorough understanding of the theoretical or mathematical aspects of general relativity should read a more advanced book, like Sean Carroll's *Spacetime and Geometry: An Introduction to General Relativity* (Addison-Wesley, 2003), Norbert Straumann's *General Relativity* (2nd edition, Springer, 2013), or Robert Wald's *General Relativity* (University of Chicago Press, 1984).

In any case, I think anyone interested in learning about this fascinating theory will find *A General Relativity Workbook* to be captivating. The book's lively style and novel design make it as easy as possible for students and nonexperts to grasp the physical concepts behind the theory. And Moore's decision to discuss the physical properties of the Schwarzschild metric before introducing the

more complicated mathematics required for deriving it from Einstein's field equations paid off. Furthermore, the book contains a wealth of useful exercises and homework problems, including ones about such exciting and modern topics as cosmic rays, gravitational lensing, inflation, and gravitational radiation from binary pulsars.

I strongly recommend *A General Relativity Workbook* to instructors teaching general relativity and to their students.

Olivier Sarbach

*University of Michoacán
Morelia, Mexico*

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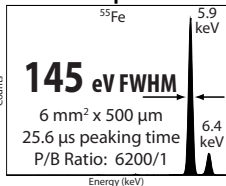


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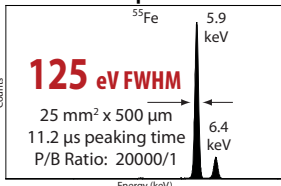
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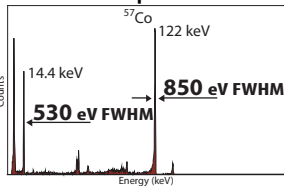
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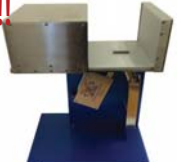


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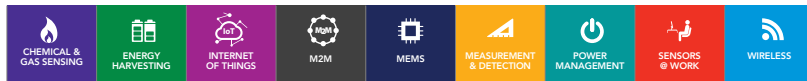
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