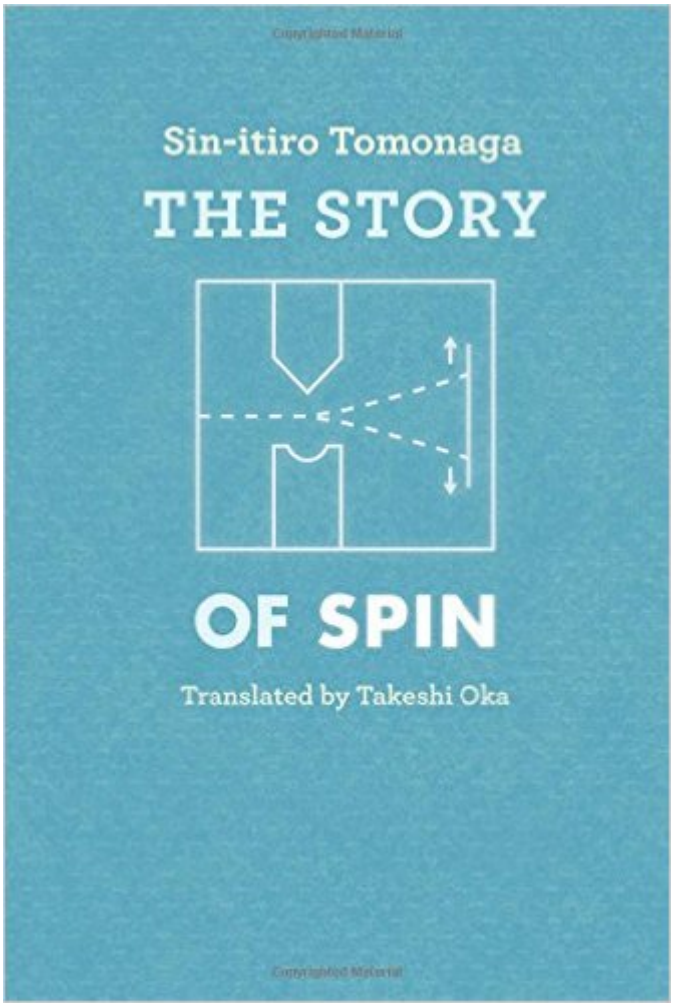
The Story Of Spin



Synopsis

All atomic particles have a particular "spin," analogous to the earth’s rotation on its axis. The quantum mechanical reality underlying spin is complex and still poorly understood. Sin-itiro Tomonaga’s The Story of Spin remains the most complete and accessible treatment of spin, and is now available in English translation. Tomonaga tells the tale of the pioneers of physics and their difficult journey toward an understanding of the nature of spin and its relationship to statistics. His clear unfolding of the tale of spin is invaluable to students of physics, chemistry, and astronomy, and his description of the historical development of spin will interest historians and philosophers of science."This piece of the history of physics will provide excellent and exciting reading. . . . It also provides the personal touch of an expert in the field that is so often lacking in the physics literature. I recommend it very highly."â ”Fritz Rohrlich, Physics TodaySin-itiro Tomonaga was awarded the Nobel Prize for Physics in 1965.

Book Information

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Customer Reviews

(The following remarks are based on a reading of only 9 of the12 chapters so far, but that is basis enough for a strong impressionand to give a warning to potential buyers of this book.) This book contains Tomonaga’s charming memoirs on the early years of Quantum Mechanics and Quantum Field Theory. It might be subtitled "Physics papers I knew and loved."--he takes the readers through an informal but masterly tour of many key QM and relativistic developments surrounding Spin as they unfolded during the 1920’s and 30’s. Thanks to the informal, historical approach, this account

possesses a human warmth and interest that no textbook is likely to match. All students of Quantum Theory must be grateful to the author for recording these lectures, and to the translator for his making them available in a pleasant, (almost) idiomatic English (and for adding some helpful remarks.) WARNING : "most accessible" treatment of Spin , as described in the Editorial Review does **NOT** mean this book is the for the casual science buff. Ideally the reader should have a very solid background in Physics--preferably at the graduate level--including at least a 1-year course in Quantum Mechanics, and some acquaintance with (Relativistic) Quantum Field Theory won't hurt at all for some chapters. Although the discussion is more informal than that of a textbook, and the math is not beyond undergraduate level, the author does not spare the equations or technical detail. Even if you lack the technical background, as I did in places (notwithstanding a Ph.D. in physics) you may still enjoy his piquant reminiscences about such masters as Pauli, Heisenberg, and Dirac, and their unique, distinctive styles of creating physics. In the final (non-technical) chapter, he also talks frankly about the state of Physics in Japan and his own struggles to enter the world of research in the "wonder years" when modern quantum theory developed.

This is one of my favourite physics books. I have always had difficulties understanding the nature of spin and this book explains it with unsurpassable style. There are so many aspects to spin that it requires the brilliant exposition of someone like Tomonaga to unpack all its subtleties: spin is not simply the self-rotation of the electron, it is also a subtle property of isotropic space. As well, spin is at the heart of particle statistics in quantum field theory. In nuclear physics, the concept of spin was also coopted into a description of iso-tropic space! Not only does Tomonaga describe the theoretical aspects of spin, but he patiently recounts the breakthough (now obscure) experiments that measured it. Some of the highlights of the book include an discussion of the nature of vectors and tensors and an immensely readable history of second quantisation that leads to quantum field theory.It is interesting to contrast Tomanaga's style with the other 2 physicists who shared the Nobel prize in electrodynamics with him. From the folksy iconoclasm of Richard Feynman to the brutal formalistic abstraction of Julian Schwinger (who broke the back of Physical Review with his third paper on electrodynamics which is one of the most equation heavy paper ever written). Then there is Tomonaga, who epitomises simplicity and clarity, with a clear-eyed reverence for the rich history of physics. He is above all, a sympathetic teacher - he tells you when something is difficult - for instance, explaining how Dirac stumbled on second quantisation "Why must you quantize it once more as the name second quantization suggests? We mortals stand bewildered here. Howerver, there is no use being bewildered, so let us try to discover why we feel bewildered." It's no wonder

that Freeman Dyson said that it was only with the framework of Tomonaga, could he weave Feynman and Schwinger together into a comprehensible whole.However, this book is not just a text-book on spin, in its pages, there is a superb history of quantum mechanics. Tomonaga gives a blow-by-blow account of the development of quantum mechanics, quantum field theory and nuclear physics, as it relates to spin. Through the recreation of the arguments and counter-arguments of the old masters of quantum mechanics, he has brought to life these characters that so dominated physics in the golden era of the 20's and 30's.