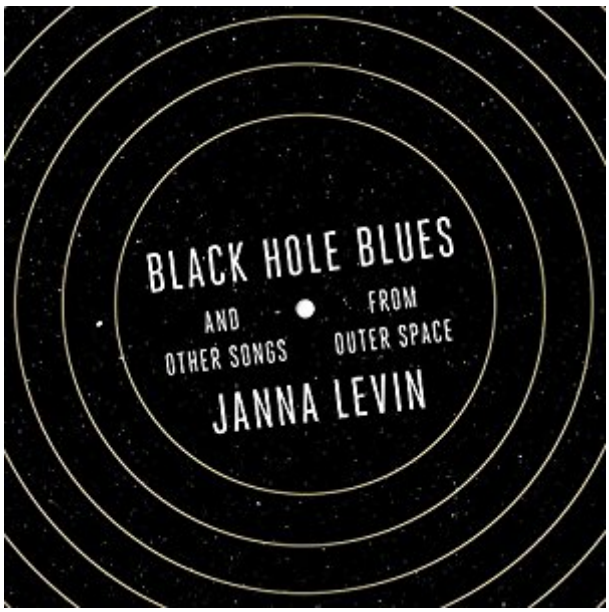
Black Hole Blues And Other Songs From Outer Space



Synopsis

The authoritative story of the headline-making discovery of gravitational waves - by an eminent theoretical astrophysicist and award-winning writer. From the author of How the Universe Got Its Spots and A Madman Dreams of Turing Machines, the epic story of the scientific campaign to record the soundtrack of our universe.

Book Information

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Customer Reviews

A few weeks ago the world of science was rattled Ã¢Â Â“ and rattled seems like the right word Ã¢Â Â“ by the discovery of gravitational waves, a culmination of EinsteinÃ¢Â Â™s general theory of relativity which the great man predicted a hundred years ago. The waves came from the collision of two black holes, an event of woefully cataclysmic magnitude, releasing energy billions of trillions of times that produced by the sun.And yet astonishingly, the collision registered here on earth in the form of a tremor so slight as to defy imagination, a tremor displacing a giant mirror located in desert scrubland by no more than a thousandth of the width of a proton. In this book author and physicist Janna Levin tells us the story of the history of that event, the machinery that went into its almost imperceptible detection and most importantly, the human beings who made this discovery possible.The book shines mainly in two aspects. Firstly, being a physicist herself Levin brings an authoritative touch to explaining the science behind gravitational wave detection. Both the history of the field as well as its present incarnations get due credit. The list of topics Levin touches on encompass such astronomical anomalies as neutrons and pulsars, intense x-rays from outer space

and black holes themselves as well as more earthly accomplishments such as laser interferometers, radio telescopes and advanced electronics. Brilliant scientists like John Wheeler, Albert Einstein and Robert Oppenheimer who worked on relativity and black holes make frequent appearances. Both theory and experiment get a nod, and itÃ¢Â Â™s clear that the best science involves both abstract theorizing as well as expert craftsmanship and engineering.It helps a lot that Levin has access to both LIGO (the observatory where the waves were detected) as well as many other institutions like MIT and Caltech which spearheaded the effort, and she visits the labs in these places and gives us a glimpse of the rough hewn, often informal, often necessarily tedious work of actual science done by graduate students and postdocs. There are accounts of walking tours of the installations and stories of encounters with spiders and rats and with bass that showed up out of nowhere in one of the ditches near the equipment. There is mention of all kinds of quirky factors which can derail the extreme sensitivity of the mirrors, from earthquakes in China to the Moon's gravity. This is science at its string-and-sealing-wax best. I would note however that the scientific history and explanations of the complex machinery involved in gravitational wave detection don't constitute the strongest part of the book; the details can sometimes be spare and the history doesn't really go too deep. The writing can also sometimes get a bit stilted.What makes the book unique in my opinion instead Ã¢Â Â“ and different from many other popular physics volumes - is the second aspect which gives us an excellent insiderÃ¢Â Â™s look at the human aspects of science. This part of the book should dispel any illusions about science being an impersonal, objective, linear and logical endeavor. Instead we meet scientists who are subject to bouts of jealousy, who accuse each other of foot-dragging and egotism, who claim that it was they rather than their colleagues who made a particular discovery or built a particular piece of equipment. And we encounter the haphazard process of scientific discovery itself, full of fits and starts, blind alleys and uncertainty, held hostage to the vagaries of government funding and public relations.Levin especially has unique access to the three main scientists - Rainer Weiss, Kip Thorne and Ron Drever - who conceived LIGO, fought for funds and personnel, worked out the theory and experimental techniques and have really stayed with the project for their entire careers. They believed in it long before anyone did, and did not let setbacks of funding and skepticism from other scientists blunt their vision. Levin has extensively interviewed these scientists and the narrative is liberally interspersed with their own quotes and their backgrounds. The quotes are often inspiring and show scientific inquiry at its dogged best, but it also shows us how scientists are human beings; how they can occasionally be petty, impatient and insecure. Sometimes individual scientific styles merge and thrive, and sometimes they can clash and dissipate rather than channel energy. What is admirable however is that one way or another

these scientists and others overcome their insecurities, worked together, fought in front of Congress to get hundreds of millions of dollars allocated to their project and saw their vision to completion. What we need to keep in mind are not their shortcomings but their success in spite of these shortcomings.There is also a valuable lesson in the book in the form of the unfortunate story of a physicist named Joe Weber who claimed to have observed gravitational waves using a simple experiment involving aluminum bars way back in the 1960s. Other scientists could not replicate his results and he had to endure much censure and ridicule, but he stuck to his guns and kept on pushing for thirty years until the very end of his life. Although Weber was probably wrong in his science, his espousal of gravitational waves turned many heads and convinced other scientists to work in the field long before it was fashionable. His example shows us that sometimes even wrong science can lead others in the right direction.LevinÃ¢Â Â™s book is thus an admirable showcase of the human side of science, and it's as much journalism as science. It really shows us how science is really done rather than how itÃ¢Â Â™s portrayed in textbooks and popular sources. And it ultimately convinces us that scientists are inspiring role models, not in spite of their flaws but because of them.

A well-written and informative description of the long struggle to build the two large laser interferometers that recently detected (twice!) the gravitational radiation emitted by the collision of two black holes. The book was actually written before the first of those detections, but, in a stroke of luck for all concerned, soon enough to enable an epilog describing it. Throughout, the author maintains a healthy balance between the geeky details (which she explains clearly enough for the non-geek to fully grasp) and the personalities, and clash of personalities, of the main participants. In contrast to most popular science books, this one devotes substantial space to a recounting of the budgetary ups and downs that beset any large project of this kind, with no guarantee of a successful completion. Add to that the very real possibility that the instrument in question might very well not have detected anything, simply because events violent enough to be detectable are just too rare, and you have the making of a suspenseful story, albeit one where we have already looked ahead to assure ourselves of a happy ending.

An important revelation of the personal obsessions,relationships and power plays of the scientists involved in the long and frustrating search for gravity waves. Sadly the writing becomes convoluted, repetitious and endless.

After seeing Dr. Levin on StarTalk, I decided to check out some of her writings. This particular

offering, while good in it’s own right, isn’t quite what I expected. Dr. Levin often in places seems to go off the rails a bit in the background stories opting to go into quite a bit of detail about how different characters were always at odds with one another for their professional careers. While this information is certainly true (and, after all, to quite to be expected) she seems to harbor on this point for an extended period of time.

This is a great, beautifully written, history of the creation of the instruments that opened a whole new window on astronomy, as told through the lives of their principal architects. There is, in fact, not much here about black holes, but the writing is almost poetical. As an old astrophysics instrumentalist, I would have liked to have seen more details about mirror suspension and noise rejection, but that might have ruined it for a general audience. Read this book! It’s timing was impeccable: the expected observations came just as the writing was ending. Success after 50 years!

Levin’s book offered a unique and very personal window into the LIGO’s history, which mainly focussed on the relationships between Ron Drever, Kip Thorne, and Rai Weiss. Their stories, triumphs, conflicts, together with the way in which LIGO grew to a 1,000-member collaboration, makes for a truly compelling read.

From the very beginnings of LIGO and the "Plywood Labs" as a defense funded project to the current incarnation as a new instrument to see "what was previously unseen." The book is a testament to those that are on the forefront of expanding the frontiers of knowledge and all that it implies.

This is a well written book, focusing mostly on the personalities and process behind the LIGO project. There is enough science to (hopefully) help a lay-person understand gravitational waves at an sufficient level to get a sense of the importance of the recent accomplishments. Janna Levin’s language is crisp on enticing. She extensively researched the topic and conducted numerous interviews and field visits to the LIGO sites and well as research facilities. There could have been more written about the current personalities in the project, which she kind of brushes past towards the final chapters.

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