Preface

In late 1967, an astonishing astronomical object named Pulsar was discovered by Jocelyn Bell, a student from Cambridge University who was holding radio observations of the universe during her PhD under her advisor Dr. Anthony Hewish. After that, theoretical and observational studies were being held in many aspects of pulsar astronomy. With the advancement of observing facilities and techniques and the accumulation of observing time, the more exotic features of pulsars are constantly being observed. However, the most basic questions of emission and rotational braking mechanisms are still not satisfactorily understood.

The pulsar might be the fastest-rotating object in the cosmos; it has a super-strong magnetic field and a densely packed internal structure. Such an extreme interior and exterior environment of a pulsar can create the most advanced laboratory in heaven to carry out experiments related to quantum field, particle physics, nuclear physics, superfluid, condensed matter, electro-magnetic radiation, general relativity, interstellar medium, etc. Thus, over the more than half century of the pulsar research, many advances have been made in these fields.

As an ordinary scholar in the pulsar research field, it is too early to write a monograph while there are not enough advances in my research work. However, I am strongly attracted by the interesting emission features and spin-down characters of intermittent pulsars, which might have the answer we have been looking for more than fifty years about the pulsar emission and spin-down mechanism. And I believe that the recent findings and the methods we developed in our research work would be useful in theoretical and observational studies of the intermittent pulsar, and may improve our understanding of pulsars.

This monograph is based on my research work in pulsar astronomy, in which Chapters 3, 4, 6, 8, and 9 are mainly based on the previous works that need to be interpreted more deeply with the current progress in the

relevant areas of the subjects. I hope this work will provide more insights about the state-switching of intermittent pulsars and the corresponding change in the pulsar magnetosphere. The link to the original paper is given under each chapter for convenience. I believe this monograph may have many defects and shortcomings. Any comments or suggestions are highly appreciated.

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