an updated analysis of the 1^{--} channel. The research presented in Chapter 3 updates the 1^{++} and 0^{-+} heavy hybrid sum rules and extracts reliable mass predictions in both cases.

QSR analyses of heavy quarkonium-like states necessarily use currents containing heavy quarks. In practice, this means that the loop integrals that must be evaluated in order to determine the Wilson coefficients are quite complicated. This is in contrast to QSR studies of hadrons composed of light quarks, which are often performed in the chiral limit where the light quark masses are neglected. However, the heavy quark mass cannot be neglected and the resulting loop integrals lead to complicated functions in the dimensionless ratio of the external momentum and the heavy quark mass. Chapter 2 discusses techniques for evaluating these integrals.

1.5 Outline of Thesis

This thesis has been prepared in the manuscript style. Chapter 2 develops techniques for evaluating loop integrals that are essential in subsequent chapters. Chapter 3 includes two closely related manuscripts that have been published in the Journal of Physics G and Physical Review D. Chapters 4, 5 and 6 each consist of individual manuscripts that have been published in Physical Review D, Journal of Physics G and Nuclear Physics A, respectively. The copyright agreements of the respective journals grant permission for articles to be reproduced in a thesis. Chapters 3, 4, 5 and 6 each include an introduction to the research presented therein, along with a discussion of the results of the research and its relation to the thesis as a whole. Chapter 7 discusses the themes of the research presented in this thesis and their relation to the field of hadron spectroscopy in general. Appendices A and B discuss conventions and mathematical functions used in this thesis, respectively.

The research presented in Chapters 3, 4, 5 and 6 involves three overarching themes. The first theme is the use of QSR techniques to extract mass predictions for exotic hadrons containing heavy quarks, and the comparison of these mass predictions with the XYZ states. The second theme involves the application of sophisticated loop integration techniques, which are described in Chapter 2. These techniques are essential for all of the research in this thesis. The third theme is the development of the renormalization methodology used in higher-order