Contents

1 Introduction 7

1.1 A Brief History Of Elementary Particle Physics 7

1.2 Discovery Of Asymptotic Freedom And The Principle Of Quark Confinement 10

1.3 The Quark Gluon Plasma (QGP) 15

1.4 Compact Stars With QGP In The Interior - Quark Stars / Hybrid Stars 22

References 28

2 The QCD Phase diagram 32

2.1 Chiral symmetry restoration - a key feature of hot/dense QCD 32

2.2 The time line of QCD phase diagram 38

References 48

3 The equation of state for SCQGP within a quark star and the Mass-Radius relationship 51

3.1 Introduction 51

3.2 Coupling strength and equation of state of QGP 53
4 Radial oscillations and stability of quark stars with strongly coupled QGP in their interior

4.1 Introduction

4.2 Normal radial modes of quark stars in the SCQGP model

4.3 Normal mode eigenfunctions of the radial modes and the energy stored in the pulsations

4.4 Damping of pulsations by non-equilibrium processes

References

5 Conclusion

References