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General Relativistic Non-radial Oscillations of Compact Stars¹ ZACK HALL, II, PRASHANTH JAIKUMAR, California State University, Long Beach — Currently, we lack a means of identifying the type of matter at the core of compact stars, but in the future, we may be able to use gravitational wave signals produced by fluid oscillations inside compact stars to discover new phases of dense matter. To this end, we study the fluid perturbations inside compact stars such as Neutron Stars and Strange Quark Stars, focusing on modes that couple to gravitational waves. Using a modern equation of state for quark matter that incorporates interactions at moderately high densities, we implement an efficient computational scheme to solve the oscillation equations in the framework of General Relativity, and determine the complex eigenfrequencies that describe the oscillation and damping of the non-radial fluid modes. We discuss the significance of our results for future detection of these modes through gravitational waves.

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