INTRODUCTION

Several times in previous studies of elastic constants and their pressure derivatives successful spot checks of the basic and classical wave propagation theory have been made. An accurate and systematic experimental study of the internal consistency of the pulse echo technique and particularly its application to pressure derivative measurements had never been made in this laboratory.

The presence of only three independent elastic stiffness constants in cubic crystals presents an excellent opportunity for inter-comparison of measurements. The elastic stiffness constant C is related to the density ρ and the acoustic wave velocity v which corresponds with C by the equation $C = \rho v^2$. Measurement of the elastic constants associated with the three normal modes of wave propagation in the [110] direction permits calculation of the elastic constants associated with wave propagation in any direction in the crystal. The directions and corresponding elastic constants chosen for comparison in this experiment are listed in Table I.