III. THEORY-ANALYSIS

Flow of the analysis is displayed in Fig. 4. From the experiment one obtains impactor velocity and a voltage-time profile of the shock response of the silver resistance. Known Hugoniot curves of silver and sapphire, and impactor velocity are used to compute the pressure-volume state in silver (Fowles, 1972). (Computation is based on the Rankine-Hugoniot jump conditions for steady shocks.) Then the shock resistivity of silver is computed. Using a P-V-T equation of state for silver fitted to experimental data, shock temperature is also calculated. Theory of a Debye solid is coupled with hydrostatic experiments on silver resistivity versus pressure to give an expression for the dependence of the temperature coefficient of resistivity on volume and to extrapolate the dependence of silver resistivity on hydrostatic pressure to 120 kbar. Then shock resistivity is corrected to isothermal conditions and compared to hydrostatic resistivity. Any deviation between shock and hydrostatic results is of interest.

Other analyses include the effect of material strength, work of plastic deformation, effect of wave reverberations in the sandwich, and eddy current corrections made in results from experiments where metal impactors were used.

A consistent set of units for calculation is time in microseconds, length in centimeters, and mass in grams. Then

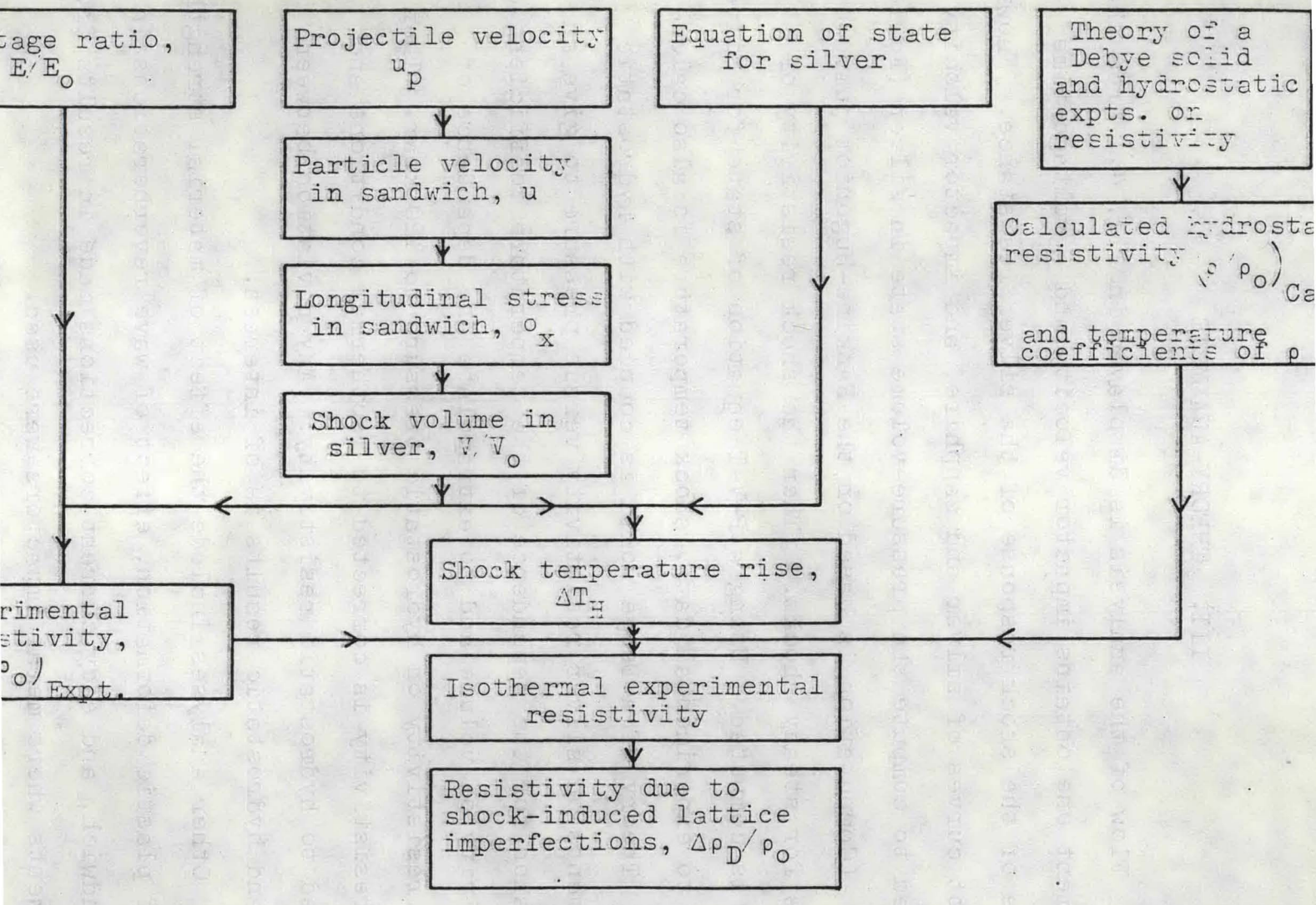

Fig. 4. Analysis flow chart.