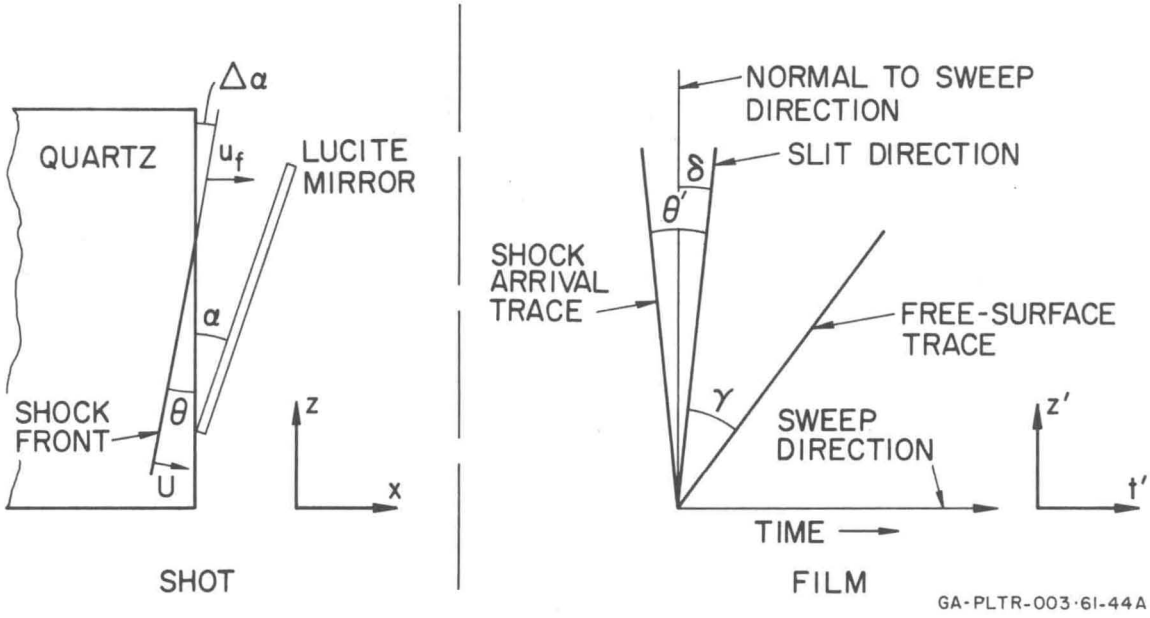


**Fig. 2.5.--Definition of Parameters Used in Adjusting Streak Camera Data.**

C. Experimental Results

The observed shock velocities are plotted as functions of the shock particle velocities (taken to be one half the free-surface velocities) in Fig. 2.6. Data by WACKERLE (15) and GREGSON (42) are also shown. The data of Wackerle are his "average" values, shown for comparison because they were determined on the same basis as the present results. The solid curves are predicted from finite strain theory, to be discussed in Section 2.33.

The agreement among the experimental data is seen to be generally satisfactory. The only significant disagreement occurs for Z-cut crystals at a particle velocity of 1.23 mm/μs. The source of this discrepancy is unknown. A shot fired by Gregson to remeasure this state agrees better with the present data*. However, if the present data are correct (rather than Wackerle's) some anomalous behavior is noted in the pressure-volume plane, as discussed below.

The stress-compression states were calculated from the measured velocities by means of the Rankine-Hugoniot jump conditions (1):

$$V/V_0 = 1 - \frac{u_I - u_0}{U_I - u_0}$$

$$\sigma_I - \sigma_0 = \rho_0(U_I - u_0)(u_I - u_0)$$

In these equations, V is specific volume, u is particle velocity, U is shock velocity, $\sigma$ is stress normal to the shock front, and $\rho$ is density. Subscripts 0 refer to the state ahead of the shock; subscripts I refer to the state behind the shock. Velocities are with respect to laboratory coordinates. Figs. 2.7, 2.8, and 2.9 show the results in the stress, specific-volume plane for X, Y, and Z crystals respectively. Bridgman's

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*Shown in Fig. 2.9.