The flat plate was hand lapped on 600 grit paper to a flatness better than 2 sodium light fringes as measured with an optical flat. The small ring (j) was also wrung down against the flat plate near the center of the larger ring. The small ring eventually housed the iron sample (e). Vacuum grease between surfaces and on the entire face of the flat plate insured easy removal of the ring from the plate after the epoxy had been poured and cured. Epoxy (Shell Epon 815 mixed 4/1 by weight with a T-1 hardener) was poured inside the large ring to a thickness of 1.27 cm. The smaller ring was left blank at this stage of target preparation. The epoxy was poured in increments of 50 gm and each increment was allowed to cure before the next was poured. The target blank was then removed from the flat plate and vacuum holes were drilled in the epoxy to allow air to flow to the vacuum line from the chamber where the flier plate was located.

The target blank was hand lapped on 600 grit paper on a layout table to obtain a flat surface; it was then wrung down on the flat plate with vacuum grease. Two 0.64-cm-wide and 1.27-cm-long mirrors were wrung down against the flat steel plate next to the iron sample to measure the flier arrival and flier tilt. The iron sample and flat mirrors in the impact plane were then epoxied in place. The first three or four experiments used the Shell epoxy to fix the sample and mirrors in place. It was discovered that for thin samples (1.5 mm or less) a stronger, more viscous epoxy (Epoxi-Patch Kit 1C) was better suited to this purpose. The completed target was then removed from the flat plate. Further lapping could not be done at this point because the silver would be removed from the mirror surfaces located at the impact plane.

This lack of a final lapping contributed slightly to the tilt, since sample and mirrors could not be put down perfectly flat. Indeed, tilts observed from this flier system were 1 order of magnitude greater than that obtained in the precursor experiments. Not all of this can be ascribed to lack of the final lapping; there are many factors other than this contributing to tilt. I concluded that imperfections in design and construction of the explosive plane wave booster were the main source of the observed tilt. These were beyond the control of the author, and it was therefore concluded that tolerances and methods of target preparation used were adequate. A better plane wave booster would be required to justify closer tolerances in target preparation.

3.5.3. Laboratory Methods

The target and explosive charge were mounted inside the test chamber on a leveled table. The table was placed so that the target assembly could be viewed through the slit of a rotating mirror streak camera aligned along the centers of the tilted mirrors. A diagram of the setup is shown in Fig. 3.2. Light from an exploding wire light source was reflected from mirror surfaces located in the target and intercepted by the camera. Incident light on the mirrors was at a slight angle from the normal to the target to allow convenient placement of the light