# CHAPTER IV

## EXPERIMENTAL METHOD

An experimental design should reproduce as closely as possible the requirements of the theoretical model. These requirements are an infinite slab of ferromagnetic material in a state of uniaxial strain normal to the plane of the slab and an applied magnetic field in the plane of the slab. Experimentally, the infinite slab of ferromagnetic material was approximated by a rectangular slab of yttrium iron garnet, YIG. The state of uniaxial strain was obtained by planar impact of a projectile from a four inch gas gun. The magnetic field was applied by a pulsed current through a rectangular solenoid enveloping the specimen. A schematic representation of the experimental procedure is illustrated in Figure 4.1. This will hopefully aid in correlating details with the overall experimental design.

Briefly, the experimental sequence is as follows. A projectile traveling at a velocity $\vec{v}$ triggers a current supply. The subsequent current produces a magnetic field which reaches a maximum at the time the projectile impacts the target. The impact produces a strain wave which propagates through the solenoid and into the YIG sample. This sample, initially in magnetic saturation, is demagnetized by the strain wave. The demagnetization develops an emf across the pickup coil which is recorded on the monitoring oscilloscopes. The magnetic equation of state of the ferromagnetic material behind the shock front is determined from these records.

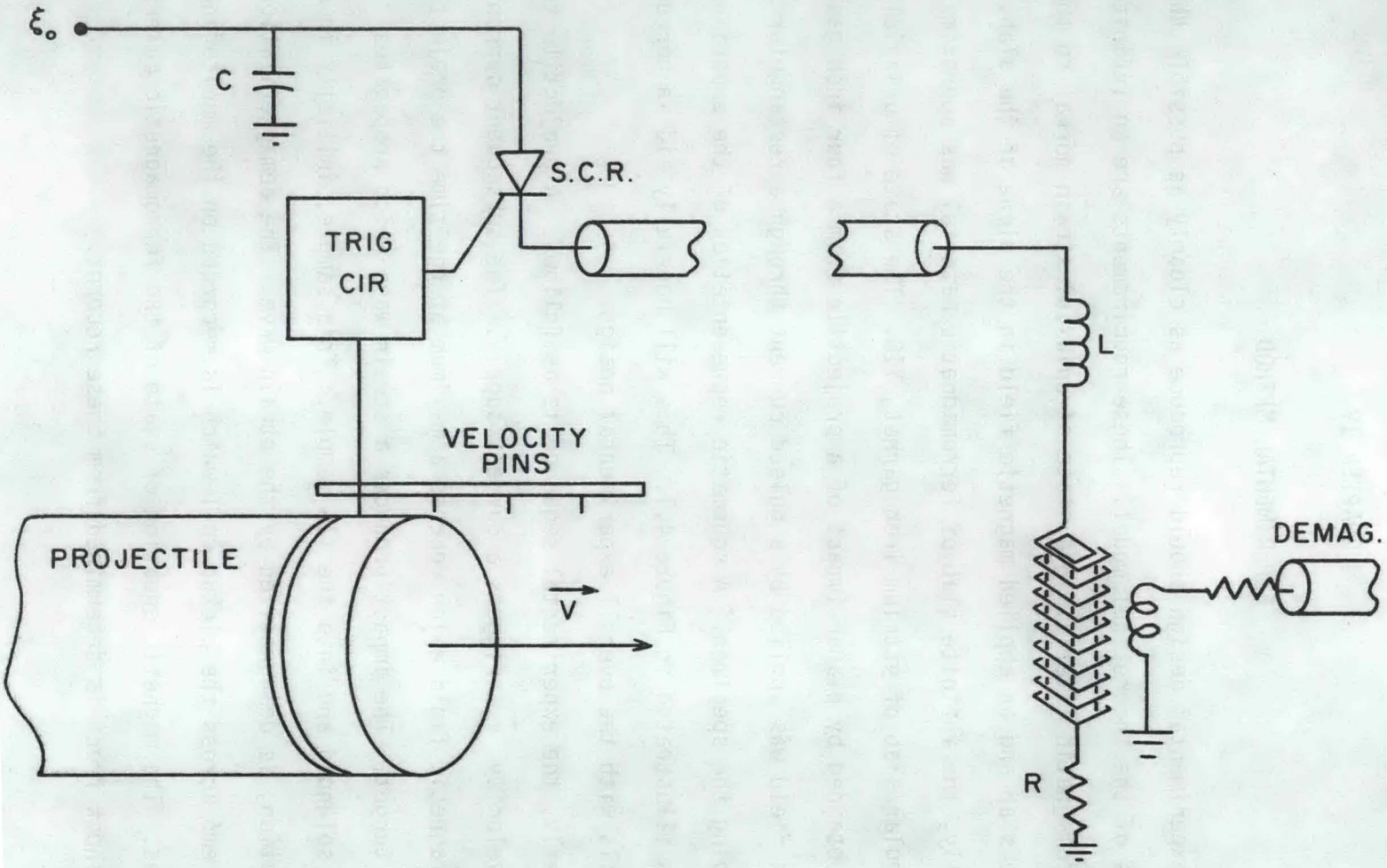


Fig. 4.1.--Schematic representation of experimental method.