Abstract Submitted
for the DFD07 Meeting of
The American Physical Society

Schlieren-interferometry with a simple adjustable Wollaston-like prism MATTHEW BISS, GARY SETTLES, Penn State, SIMON SANDERSON, GE Security — We demonstrate that a simple polycarbonate prism, here referred to as a Sanderson prism (Rev. Sci. Instr. 76(11), 2005), behaves under mechanical loading identically to the classical Wollaston birefringent prism. By varying the load, the Sanderson prism is adjustable up to the yield point of the polycarbonate, providing a typical range of beam divergence angles theta of 0-24 arcminutes. This range is thoroughly explored. The utility of the Sanderson prism for differential schlieren-interferometry at small theta and standard interferometry at large theta is demonstrated by using it in place of the knife-edge cutoff in large and small schlieren systems with laser or white-light illumination. A candle plume, the human thermal plume, and a small supersonic jet are used as example flows. Given the simplicity, adjustability, and low cost of the Sanderson prism, schlieren optics are easily converted to interferometry by applying it. Our exploration of differential interferometry at small theta and of white-light interferometry with the Sanderson prism extends the original work cited above.

Gary Settles
Penn State

Date submitted: 02 Aug 2007 Electronic form version 1.4