

## *Conclusions*

A displacement sensor employing the principles of Michelson white-light interferometry and utilizing a sapphire fiber sensing head was developed and demonstrated. Operational tests were conducted in environments that ranged from room temperature to 800 degrees Celsius. The sensor is capable of measuring displacements exceeding 6.4 millimeters at room temperature, but is limited to displacements under 1 millimeter at 800 degrees Celsius. The signal to noise ratio of the signal of interest routinely exceeded 12 decibels at room temperature, but degraded to 7 to 8 decibels with increased temperatures. The degradation in the signal to noise ratio with elevated temperatures is thought to be a consequence of the poor optical quality of the sapphire fiber. The performance of the sensor is adversely affected by vibration and currently requires a high level of operator involvement. It is anticipated that the performance of the system will be substantially improve by upgrading several components, and that it will become easier to operate after put under computer control.

The use of the developed system is also demonstrated to be a useful alignment tool for assembling sapphire-fiber based extrinsic Fabry-Perot interferometers.

Suggestions for future work were presented.