PHYSICS AND ASTRONOMY

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ABSTRACTS

Fiber Optic System for Sensor Applications and Environmental Control. Torsten Alvager, Angel Anez, David Beach and Cindy Thomas, Indiana State University, Terre Haute, Indiana 47809.——The recent introduction of fiber optical light guides for remote spectroscopic sensing has opened a new era of studies of hostile or otherwise inaccessible environments. The method is also of importance in a variety of other situations such as in studies of solid state systems and systems related to damage and environmental control.

A problem often hampering the possible use of the fiber optical light guide technique is the scattering of light that occurs when low transparent samples are investigated. In this study the general objective has been the development of a method to enhance the fluorescence signal in relation to the scattering signal of a typical measurement with fiber optic remote spectroscopic sensing. This has been achieved by use of a well-known timing method. Preliminary experiments indicate that an enhancement of at least a factor times one hundred is possible to obtain using the new method.

Observing Halley's Comet from Indiana and Brazil. Malcom E. Hults and Roger L. Scott, Ball State University, Muncie, Indiana 47306.——Halley's Comet was not a bright object duirng the 1985-86 apparition, but its appearance was of extreme interest to astronomers and the general public over the world. In the fall and winter months the comet was rather faint and was seen best through binoculars and telescopes. However, during March and April 1986, the comet reached easy naked eye visibility and exhibited a tail several degrees in length. The authors were able to observe the comet several times from December 1985 to May 1986, and to photographically record its changing appearance. Observations were made by both authors in Indiana, and by author Hults in Brazil, South America. Photographs were taken with a number of films; Kodak Professional Ektachrome (ISO 800/1600) yielded the best results. Slides of the comet taken at various distances from the earth will be shown and correlated with the respective positions of the earth and comet in their orbits. The authors also will show a few slides of the beautiful southern constellations and discuss a cooperative program between Ball State University and the Federal University of Santa Maria in Brazil.

Radon Daughter Concentrations in Selected Homes in Indiana, Illinois and Michigan. Elmer N. Nussbaum, Roger W. Roth, Department of Physics, Taylor University, Upland, Indiana 46989 and Jon A. Roth, ITT, Aerospace/Optical Division, Fort Wayne, Indiana 46801.——Radon concentrations of indoor air are inferred from the measured alpha activity of radon daughters collected on a millipore filter that has sampled the air. The total alpha disintegrations during three selected time intervals after the samp-

ling period are determined with a windowless gasflow proportional counter. The initial concentrations of the radon progeny RaA (Polonium-218), RaB (Lead-214), and RaC (Bismuth-214) are then calculated using the method developed by Thomas (Thomas, Jess W., *Health Physics*, Vol. 23, 783, 1972). The results, expressed in working level (WL), ranged from 1 mWL to 18 mWL.

Voice Recognition and Speech Synthesis as Aids in Real-time, Computer-aided Measurements of High Energy Physics Star Events in Nuclear Emulsion. GERALD P. THOMAS AND SUE THOMPSON, Ball State University, Muncie, Indiana 47306.——A description is given of the operation and use of an Interstate Electronics SYS 300 Voice Recognition System and Votrax Personal Speech System in the optimization of a real-time, computer-aided Koristka optical-microscope-based 3-d measurement technique in the field of experimental high energy physics. This optimization reduces the need for movement by the microscopist thereby reducing the difficulty and duration as well as the measurement error of these inherently delicate measurements.