

IUE Suggests Gas Cloud Around Possible Protoplanetary System

By Charles Recknagel

Do other planetary systems exist beyond our solar system?

The case for a 'yes' answer has received a boost from a recent observation by Goddard's International Ultraviolet Explorer (IUE) satellite revealing what appears to be a variable cloud of gas surrounding the star Beta Pictoris. The star, in the constellation Pictor in the southern hemisphere, is thought by many astronomers to be a leading contender for another planetary system.

Observations made last year

The observations, by Dr. Yoji Kondo, IUE Project Scientist, and Dr. F. C. Bruhweiler of Catholic University in November last year, are the first evidence that Beta Pictoris may be surrounded by gas as well as large dust particles and dust as previously reported from observations using the Infrared Astronomy Satellite (IRAS) and ground based telescopes.

According to Kondo and Bruhweiler, the IUE findings of co-existing dust and gas clouds around Beta Pictoris are consistent with scientific theories of planetary system formation.

"Many stars like Beta Pictoris show evidence of being surrounded by clouds of gas at ultraviolet wavelengths," says Kondo. "If such data imply that these stars also are surrounded by a protoplanetary gaseous cloud with a disk of dust particles, then many nearby stars may have evolving planetary systems. That's exciting because these stars would offer a unique opportunity to see the way a solar system might appear in formation."

Spectra of Beta Pictoris

Kondo and Bruhweiler used the IUE telescope to obtain the ultraviolet spectra of Beta Pictoris to determine the manner of the absorption of ultraviolet light by the gas cloud and the extinction of the light by the dust cloud. The ultraviolet spectra show an absence of selective extinction of light at shorter

wavelengths, evidence that the star's light is being blocked evenly at all wavelengths by dust particles greater than about 1 micron (millionth of a meter) as reported from infrared data.

"The IUE observations," says Kondo, "indicate the gas is either clumpy or is varying under the pressure of the stellar wind and radiation. If so, this would tend to complement IRAS and ground telescope observations of a substantial dust cloud of protoplanetary material around Beta Pictoris."

Alternative possibility

Kondo and Bruhweiler caution that there is an alternate possibility that the lack of observed extinction could be due to viewing the star just a little off-plane, so that the telescope's line-of-sight was not directly through the disk of orbiting dusty matter.

However, Bruhweiler notes, "that would be unlikely. All evidence seems to point to a belt too thick around Beta Pictoris for the line-of-sight to be missing the dust belt."

John O'Keefe Honored

Dr. John A. O'Keefe, code 681, has received an honorary Doctor of Science degree from Alfred University, Alfred, New York for "his pioneering contributions" to the nation's space program and for "his discoveries in natural glasses." He received the degree at the 1985 commencement exercises on May 11.

"Through investigations of their (tektites) origin and occurrence, he has been able to offer major contributions to understanding the geologic history of this planet - including the disappearance of biological species such as the dinosaur," the citation read.

Dr. O'Keefe, of Goddard's Laboratory for Astronomy and Solar Physics, was a visiting professor of geoceramics in Alfred for four months in 1983. During that time, he co-edited "Natural Glasses," a book consisting of proceedings from a five-day conference at Alfred.



RUNNING WITH HEART—The Goddard team of Barbie Beckford (right), B.J. King, Dawn Oakley (left), Vickie Pendergrass, Becky Lambrose, Grace Lee, Gincy Stezar (center) and Joan Unger placed first in the women's division of the Blake Heart Run 10K April 27 in West Potomac Park, D.C. Stezar, Goddard's Fitness Director, was chairman of the race which raised more than \$30,000 for the American Heart Association. Beckford, King and Unger were top finishers in the competition.