

★ S T A R D U S T



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MICHALITSIANOS TO PRESENT IUE BINARY U-V STUDIES



DR. MICHALITSIANOS

Dr. Andrew G. Michalitsianos, Laboratory for Astronomy and Solar Physics, Goddard SFC, NASA, will speak at the December 6 meeting of National Capital Astronomers. He will discuss *symbiotic stars*, objects that exhibit composite spectra at optical wavelengths. The term was coined by Paul Merrill who observed these objects extensively from Mount Wilson in the 30's.

Typically, a strong absorption spectrum from a late type star is seen that has superposed spectral emission lines of high excitation that suggests the presence of a subluminous but very hot companion star. The International Ultraviolet Explorer (IUE) enables us for the first time to explore the emission properties of the hot companion because the cool luminous late type star by virtue of its surface temperature of about 3000K makes essentially no contribu-

tion to emission in the far ultraviolet. We have thus explored the physical properties of the system and have arrived at conclusions regarding the general structure of symbiotic stars and the ionized nebulosity that envelops the system.

Andrew G. Michalitsianos received his B.S. in physics-mathematics from the University of Arizona in 1969, where he was also employed at Kitt Peak National Observatory. He received his Ph.D. from Cambridge University, England, in 1973 and began a post-doctoral fellowship at the California Institute of Technology in Pasadena. Previous to his present position, Dr. Michalitsianos was an associate of the National Research Council at NASA Goddard and spent eight months in the Solid State Physics Laboratory at the Swiss Federal Institute of Technology in Zurich, Switzerland. He is now involved in the development and operation of several solar and astronomical satellites.

DECEMBER CALENDAR — *The public is welcome.*

- Tuesday, December 2, 9, 16, 23, 30, 7:30 PM — Telescope-making classes at Chevy Chase Community Center, Connecticut Avenue and McKinley Street, NW. Information: Jerry Schnell, 362-8872.
- Friday, December 5, 12, 19, 26, 7:30 PM — Telescope-making classes at American University, McKinley Hall basement. Information: Jerry Schnell.
- Friday, December 5, 12, 26, 8:00 PM — Observing with the NCA 14-inch telescope with Bob Bolster, 6007 Ridgeview Drive, south of Alexandria off Franconia Road between Telegraph Road and Rose Hill Drive. Call Bob at 960-9126.
- Friday, Saturday, Monday, December 5, 6, 8 — United States Naval Observatory sesquicentennial celebration. See story on page 15.
- Saturday, December 6, 6:15 PM — Dinner with the speaker at the Thai Room II, 527 13th Street, NW. Reservations unnecessary.
- Saturday, December 6, 8:15 PM — NCA monthly meeting at the Department of Commerce Auditorium, 14th and E Streets, NW. Dr. Michalitsianos speaks.

NOVEMBER LECTURE

Dr. Minas Kafatos, of the NASA Goddard Laboratory for Astronomy and Solar Physics, spoke at the November 1 meeting of National Capital Astronomers on the effects of stellar winds and supernovas.

It is well known that massive type-O stars' very strong stellar winds blow away the interstellar medium producing very low-pressure *bubbles*; and that later, in the supernova stage, the stars again, much more rapidly, blow away the remainder in another bubble. Kafatos and colleagues study the superbubbles formed when a long series of stars in a small volume all do this, the effect of the interstellar medium on the history of the star group, the progress of the supernovas' development, and the likelihood of a supernova remnant resulting.

A hot, heavy O star at about 50,000 K emits strongly in the ultraviolet and ionizes the surrounding hydrogen, forming an H-II region. The shock of the high-velocity stellar wind of 10^{-6} to 10^{-5} solar masses per year sweeps away the interstellar medium. It is gradually slowed by compressing the material, and by encountering new material of the H-II region. The later supernova shock is even far faster.

As lighter O and still lighter B stars (these latter generate little wind) go supernova, many bubbles combine to form a huge superbubble. As at least half of the stars are double, the supernovas blow away companions producing the very high velocity *runaway stars*. The average interstellar region is not typical of that in which supernovas occur; at least two types are more typical: comparatively dense molecular clouds, and very low-density regions inside bubbles (where later supernovas often occur). In both, supernova shells develop faster than in the more usual regions for quite different reasons in the two cases.

Early bubble expansion is free, then encounters mass, e.g., H-II. Then mass is compressed in an energy-conserving adiabatic phase. After sufficient deceleration, momentum rather than energy is conserved, much energy being radiated away in an isothermal expansion; the shell is slowed to the local sonic velocity as the shock phenomenon ends.

Shock waves, especially supernova events, also trigger star formation. Supernovas that occur within bubbles are much less dense stars than those that produced the bubbles. The early supernovas occur in the denser intermolecular clouds themselves; most later ones occur inside the bubbles. Very late and very-high-velocity-star supernovas can occur in the normal interstellar medium. The progress of a supernova event is also affected by the galactic gravitational field; a preference for the galactic plane results. Also, most supernova remnants occur toward galactic center where conditions can generate them.

Kafatos and colleagues have been able to demonstrate a reasonably good agreement between theory and observation — in particular, to account for the relative rarity of supernova remnants. jbl

PRESIDENT'S MESSAGE

NCA has been holding its monthly technical lectures in the Department of Commerce Auditorium for the past 30 years. During this time, we have received the full cooperation and support of the Department's Buildings Management staff. However, they have asked me to remind you of the conditions under which we continue to enjoy the use of this beautiful facility.

Basically, we are expected to leave everything in the condition and position in which we find it upon our arrival. We are not authorized to operate any of the equipment in the auditorium. Everything we bring in must leave with us at the end of the evening. If you encounter any problems or difficulty with access to the auditorium, or with equipment availability, please bring them to my attention immediately. *Do not ask the security guards to assist you in solving problems, as they are neither responsible for nor knowledgeable about the technical operations of the auditorium's equipment.* In any case, guards should not be distracted from their sole function of assuring building security. Normally, I am available at 667-6721 or, just before the lecture, I will be at dinner with the speaker.

Thank you for your attention to these conditions. Your continued cooperation will help to maintain the excellent relationship we have enjoyed with the Department for so many years. Mary Ellen Simon

NATIONAL CAPITAL ASTRONOMERS SALUTES U. S. NAVAL OBSERVATORY

On the occasion of the sesquicentennial celebration of the United States Naval Observatory, National Capital Astronomers extends to the Observatory, its administration and staff, best wishes for a future even more splendid than its distinguished past!

NCA was born at a small meeting at the Naval Observatory in 1937. Through the intervening years we have enjoyed a warm relationship, many privileges, and opportunities to cooperate in programs and activities such as classification of historical photography and expeditions for occultation observations. We express our sincere appreciation and our hope to be of greater service.

Ceremonies at the Observatory on Friday, Saturday, and Monday, 5, 6, and 8 December will feature colloquia, a public open house, and a birthday party. NCA will participate with displays and telescopic observations of the Sun at the NCA facility at the Observatory, weather permitting.

Program details may be obtained from LeRoy E. Doggett, Nautical Almanac Office, U. S. Naval Observatory, Washington, DC 20390.

FORMER NCA JUNIOR MEMBER AWARDED NOBEL PRIZE



DR. GILBERT

Dr. Walter Gilbert, American Cancer Society Professor of Molecular Biology at Harvard University and a former member of National Capital Astronomers, has been awarded a 1980 Nobel Prize in Chemistry. Frederick Sanger, Cambridge University, England, and Paul Berg, Stanford University, share the prize.

Gilbert discovered a method of sequencing the DNA (deoxyribonucleic acid) molecule — the vehicle which conveys genetic characteristics.

Gilbert received the B. A. in chemistry and physics from Harvard *summa cum laude* in 1953, the M. A. in physics from Harvard in 1954, and his Ph. D. from Cambridge University, England, in Mathematics. He received the Albert Lasker award in 1979.

In a telephone interview with *Star Dust*, he recalled working in our telescope-making class, photographing sunspots, mostly with homemade equipment, making meteor observations, winning the 1949 Westinghouse Science Talent Search, in which Harlow Shapley served as a judge, and expressed other pleasant memories of his youth in Washington. We're proud of you, Wally!

OCCULTATION EXPEDITIONS PLANNED

Dr. David Dunham is organizing observers for the following grazing lunar occultations in December. For further information call Dave at 585-0989.

Date	UT Time	Place	Vis Mag	Pct Sunitit	Cusp Angle	Min Aper
LUNAR:						
12-14-80	01:18	Enon Valley, PA	6.7	38	5S	5 cm
12-15-80	02:23	Germantown, MD	8.3	27	4S	10 cm
12-28-80	10:40	Medford, NJ	6.9	54	8S	5 cm
12-21-80	10:01	Andrews AFB, MD	8.3	30	7S	5 cm

ASTEROIDAL APPULSES:		Star	Angular	Name	
(Photoelectric — for satellites)		Mag	Miss Distance	of Asteroid	
12-17-80	02:27	8.8	1.9N	(54) Alexandra	13 cm
12-26-80	01:44	9.2	3.5N	(7) Iris	20 cm

WASHINGTON ACADEMY, NASA TO HOLD UHURU MEMORIAL SYMPOSIUM

A score of speakers will discuss X-ray astronomy at Goddard Space Flight Center on Saturday, 13 December, 8:00 AM to 5:20 PM. Registration is \$25. For further information, call the Washington Academy of Sciences, 347-3368.

EXCERPTS FROM THE IAU CIRCULARS

1. October — P. MacKinnon and R. A. Keen, Boulder, Colorado, observed a meteor shower from an unexpected radiant in southern Cygnus in late September and early October.

2. October — The Voyager Imaging Science Team reported the discovery from Voyager 1 of two new satellites of Saturn, 1980 S 26 and 27, with orbits just inside and outside the F ring.

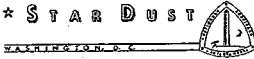
3. October 28 — P. Wild, Astronomical Institute, Berne University, discovered a supernova of 13th magnitude in NGC 6946.

4. October 28 — H. Kosai, Tokyo Astronomical Observatory, discovered a nova of 9th magnitude in Sagittarius at RA 18h 16.5m, Dec 24 deg 25'.

5. November 6 — Rolf Meier, Ottawa, Ontario, discovered a 10th-magnitude comet (1980q) in Hercules with a 40-cm F/5 reflector. Comet Meier will reach perihelion on December 4, but is already receding from the Earth.

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* STAR DUST



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