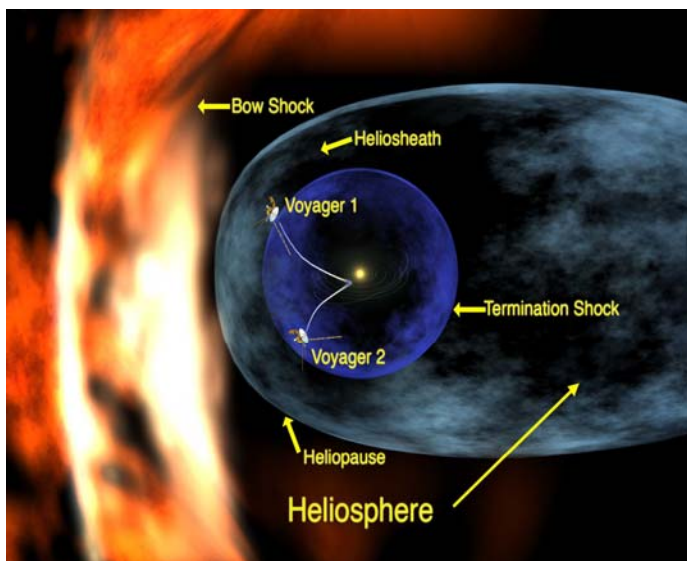




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Alumnus Ajoy Mallik '92 now manages all Venture Capital for TATA Consultancy Services. Read about his life after UMD in the Alumni Spotlight section.



Dr. Douglas Hamilton wrote this month's Research Spotlight about Voyager 1 entering the heliosheath.

This month's Colloquia speakers include: Jeremy Bernstein and Barton Zweibach. To find out more about their colloquiums and other up coming events, view the Up Next section.

In sad news, the Physics department has lost a beloved member of its family, Professor Manoj K. Banerjee. To read about his accomplishments and outstanding contributions to the department, University and physics view the In Memoriam section under News.

Graduate student, Willie Merrell wrote this month's Graduate Blog. Merrell recalls the similarities and differences with physics graduate students at other universities.

Robert Park, in an interview with the Dow Jones Newswire, refuted claims by a New Jersey medical doctor who claimed to have found a new source of energy that turns the laws of physics on its academic head. Read about other faculty that have appeared in the news in the News section.

The Corporate Scholars Program is offering a combined scholarship/internship opportunity. In addition to a great work experience, this is a chance to work closely with a mentor, enhance a student resume, learn about the different fields a degree can lead to and really help in the professional development of our undergrads. If you or someone you know is interested visit www.cmps.umd.edu/csp/index.htm for more Information or to apply online. The deadline to apply is March 8, 2006.

If you are interested in contributing an article or blog to the Photon, please contact Carole at: ccuaresm@physics.umd.edu



DEPARTMENT OF
PHYSICS
UNIVERSITY OF MARYLAND



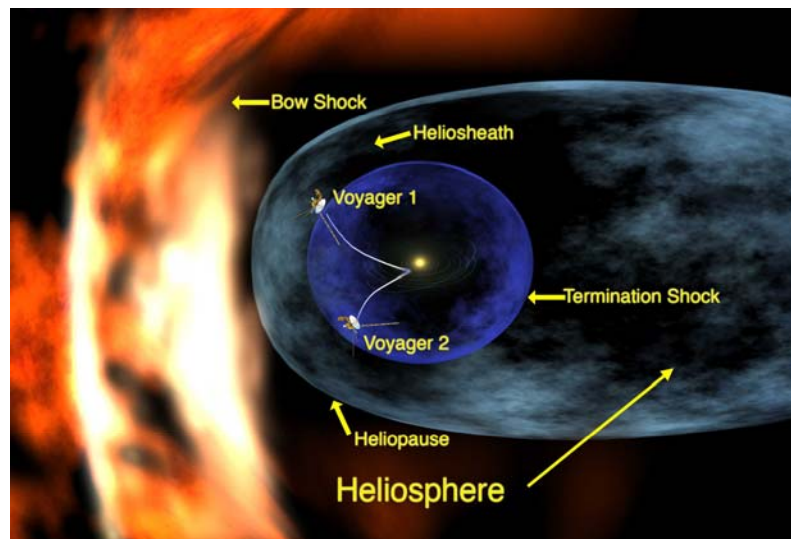
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After a 27-year Journey, Voyager 1 Enters the Heliosheath



By: Dr. Douglas Hamilton

On December 16, 2004 the Voyager 1 spacecraft crossed the boundary between the supersonic solar wind and the much slower, denser and hotter solar wind plasma of the heliosheath. The boundary, known as the solar wind termination shock, has been anticipated for years and was encountered at distance of 94.0 AU from the sun or 94 times the Earth-Sun distance. That's more than twice the distance to Pluto, the last planet. The crossing was obvious in data returned by a number of instruments on Voyager 1 that measure charged particles and magnetic fields including the Low Energy Charged Particle (LECP) instrument.

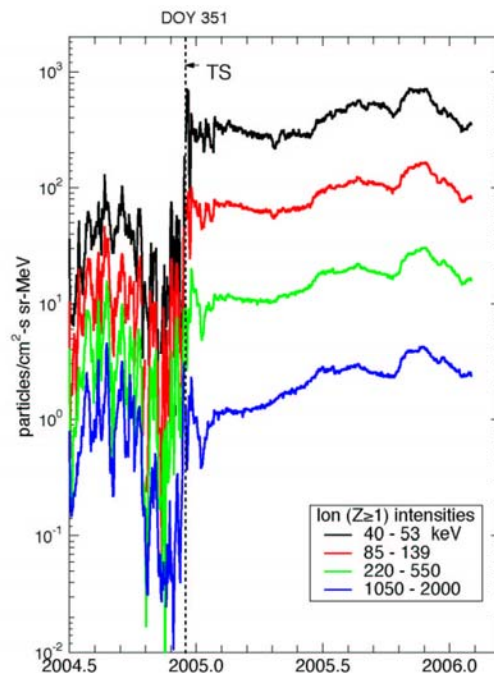


The department's Space Physics Group built much of the LECP instrument in the mid-1970's, and since their launch in 1977, Voyager 1 and its twin Voyager 2 have been setting endurance and distance records. I came to the University of Maryland as a postdoc in 1978 to work with Prof. George Gloeckler on the Voyager data. The early part of the mission featured flybys of all the gas giant planets starting with Jupiter in 1979 and ending with Neptune in 1989. After Neptune, NASA renamed the mission the Voyager Interstellar Mission. The goal is to explore the outer reaches of the solar system for the first time, including the heliosheath and eventually the interstellar medium. When Voyager 1 eventually crosses the heliopause, it will leave the heliosphere, a bubble formed in the Milky Way by the solar wind produced by the Sun. It will then enter the clouds of dust, gas and charged particles of the interstellar medium. Models predict that

Research Spotlight continued: Voyager 1 may reach that final goal well before 2020, when power supplied by its RTG's (radioisotope thermoelectric generators) falls below the minimum required.

In the meantime, Voyager 1 will continue to explore heliosheath and, within the next couple years, will be joined there by Voyager 2, which is about 17 AU behind. It's not easy to predict when Voyager 2 will cross the termination shock even with the knowledge of Voyager 1's crossing. The termination shock is not stationary and responds to solar wind pressure, which changes with the 11-year solar cycle. It appears likely that Voyager 1 did not cross the shock because of the spacecraft's outward motion but rather the shock crossed Voyager 1 on its way inward. The shock should be about as close as it gets to the Sun now. We're approaching solar sunspot minimum when the solar wind pressure actually increases. Although it only takes the solar wind four days to travel from the Sun to the Earth, it takes over a year to reach the termination shock. So there is a delay in the effect of the faster solar wind being felt there. Since Voyager 2 is at a southerly solar latitude, its actual crossing distance will be of great interest. It will shed light on north-south asymmetries expected to exist because of the orientation of the interstellar magnetic field.

The termination shock had been universally thought to be a prodigious accelerator of charged particles, and our findings largely confirm that. The LECP observed large increases in ion fluxes at energies up to about 2 MeV. At somewhat higher energies of tens of MeV, there is population of particles known as anomalous cosmic rays. They are called anomalous because they consist mostly of noble gas elements rather than reflecting the usual abundances of the periodic table. For the last 25 years, it has been thought that anomalous cosmic rays were accelerated at the termination shock. Much to our surprise their intensity did not peak at the termination shock but continues to increase as Voyager 1 travels deeper into the heliosheath. Obviously, their origin has yet to be discovered.



Voyager 1 LECP

More surprises are certain to come our way as the two Voyager spacecraft continue their journeys.

Dr. Hamilton is a professor for the University of Maryland. He is a member of the Space Physics group. Visit the group website at, <http://space.umd.edu/> or contact him at, douglas.c.hamilton@umail.umd.edu



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Ajoy Mallik: Manager of all Venture Capital for TATA Consultancy



In some cases what you major in, in college, doesn't necessarily determine your career outcome. Ajoy Mallik graduated from the University of Maryland with a bachelor's degree in Physics, in 1992 and later received his master's degree from the University of Miami in International Business and Information Systems. Now, he is responsible for all of Venture Capital and Corporate Development for TCS (TATA Consultancy Services). TCS is one of Asia's largest software service companies and India's \$29 billion business conglomerate. While extremely successful, his position is not typically what one would predict from a Physics alumni.

Mallik left India at 18 and attended UMD because his father was a diplomat posted to the Embassy in Washington D.C. He describes his college experience as "OK," and advises current students to take a different approach.

"My experience at UMD was a lot of work and difficult courses," said Mallik. "I felt that I did not get to enjoy the social aspect of college life to the fullest. Do not underestimate the rigor and difficulties in most classes 3xx and above. Don't forget to balance life out and have healthy fun."

After leaving UMD and graduating from the University of Miami, Mallik held various positions including an entrepreneurship in high-tech, a director of business development for 123 Sign Up, an online event registration and membership management service and a venture capitalist. He was also a member of the board of directors for Child Family Health International, a nonprofit dedicated to building health care services or underserved communities worldwide. His current position does not require knowledge in Physics; however his background has been very helpful and useful in daily life, and he is still very pleased with his undergraduate decisions.

"At that time (1988), Physics was a top 10 department," said Mallik. "It has made my thought process analytical and logical. I break down real world problems into numbers and equations and try to solve them--- this does not always work, but it does save time from emotional chaos and stress."

If you are interested in contacting Ajoy Mallik, please send your messages to the Editor, who will be happy to forward your questions and comments.



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M. Ouyang

Congratulations

Min Ouyang and **Alessandra Buonanno** were awarded the Alfred P. Sloan Research Fellowship. The award is intended to enhance the careers of the very best young faculty members in specified fields of science. The fellowship also carries a grant of \$45,000 for a two-year period.



A. Jawahery

Abolhassan Jawahery was appointed as the spokesperson for the BaBar Experiment. BaBar is one of the few major high energy physics experiments in the world. For more information visit: <http://www.slac.stanford.edu/BFROOT/>



R. Ellis

Richard Ellis received a \$408,000 grant from the Department of Defense for "The Maryland Centrifugal Experiment".



P. Roos

Phillip Roos received a \$450,000 grant from the National Science Foundation for "Experimental Nuclear Physics Research Program."



E. Seo

Eun-Suk Seo received a \$270,000 grant from NASA for "Cosmic Ray Energetics and Mass (CREAM)"

Diane Pugel, will receive the Goddard Honor Award in May. The award is given annually to less than 10 people for their leadership on Center.



S. Wallace

Stephen Wallace received a \$673,000 grant from the Department of Energy for "Theoretical Studies in Hadronic and Nuclear Physics"

In the News

James Gates was interviewed by the Central News Agency in January about his views and role in advancing physics education.

Sankar Das Sarma, is mentioned in an article on PhysicsWeb.Org on January 10th as one of the leaders in new experiments involving particles called anyons that do not fit into the usual categories of fermions and bosons may lead to high-performance quantum computers. View the article at:

<http://physicsweb.org/articles/world/19/1/5>

Robert Park, in an interview with the Dow Jones Newswire, refuted claims by a New Jersey medical doctor who claims to have found a new source of energy that turns the laws of physics on its academic head.

RECENT EVENTS



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IN MEMORIAM



M. Banerjee

The UMD Department of Physics has lost one of its beloved colleagues. Professor Manoj K. Banerjee passed away on February 18, 2006. He was a husband of the late Uma Banerjee, loving father of Sanjoy Banerjee and his wife Alison Kelly, grandfather of Shreya, Arjun and Stirling. He is also survived by several relatives and friends.

Dr. Banerjee served the department for nearly 40 years. He was a distinguished scientist who has made significant contributions in all three areas of academic endeavor demonstrating extensive skills in carrying out his research, teaching and service duties. His awards and honors included the Weizmann Fellowship in 1962, fellow of both the APS and the Indian Academy of Science and earning the Humboldt Research Award in 1996. He was a colleague, family member and friend. Dr. Banerjee will sorely be missed.

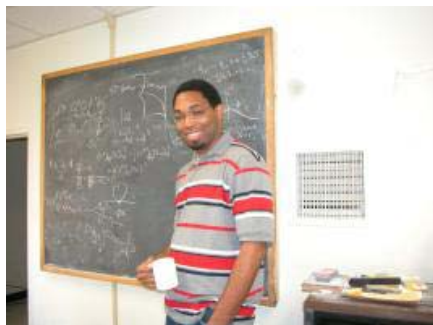
A service was held at Pumphrey's Bethesda-Chevy Chase Funeral Home on February 25, 2006.

In lieu of flowers, contributions may be made, in his honor, to the charity of ones choice.



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Willie Merrell: 10 Months of Traveling



I have always hoped to enjoy, what I saw as one of the great rewards in physics, which is to travel. Over the past ten or so months I got my wish and it has been quite an experience.

It started last April when I spent three months at Princeton University in New Jersey . I got a lot of work done, learnt a lot of things and I got to see graduate student life in a different environment. Princeton is the only place I've seen, so far, where the graduate student housing complex has a full bar in its basement. Study hard and party harder. Sometimes that bar was the social hot spot for the town.

Then I spent the fall semester at the Kavli Institute for theoretical physics at the University of California Santa Barbara. This place was a real eye opener. I saw professionals from all over the country come together to talk physics, play soccer, and eat. If anyone thinks that studying physics is a non social endeavor, they should go to the Kavli institute. I think that the most important thing that I learnt there was that even the people who seem really smart and independent learn a lot of what they know by asking a lot of questions (sometimes, they'd even ask some not so smart questions). Added to being right next to the beach, I'd say overall it was a great place.

Then in January I went to the University of Michigan to continue a collaboration that I started at UCSB. Once again, I entered a unique environment. This place was ridiculously cold, as I expected, but it shared to the same personality types and desire for excellence in physics, that I experienced in my previous trips and that I recognize here at Maryland . To top it off, Michigan has really big cookies.

One really does get to see very different things when one travels. It's good to see that grad student issues don't change very much. Jackson is Jackson no matter what school you're in. And quals are hard. There are many different people one has to work with, some nice, some not so nice. Research is exciting and exasperating all at the same time. Yes, I had a great time traveling. Jet lag sucks though.

UP NEXT



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March 07

Colloquia: Jeremy Bernstein, Stevens Institute of Technology

Albert Einstein and the Existence of Atom

Room 1410 Physics Building

Program begins 4:00 p.m.

March 16 -18

Physics is Phun

Going in Circles with Physics

Physics Lecture Hall - Physics Building

Program begins 7:30 - 8:45 p.m.

March 28

Colloquia: Barton Zwelbach, Massachusetts Institute of Technology

The Physics of Relativistic Strings

Room 1410 Physics Building

Program begins 4:00 p.m.

March 20 - 24

Spring Break

April 1

Open House



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Dear Colleagues,

The spring semester has begun and we're all off and running in the Department, but many of us are back, from running far from College Park. One of the many benefits of being in this field includes traveling across continents to give talks, attend meetings or collect data for research. This winter, as always, many faculty were traveling to many exotic locations to work on physics projects.



In January, Jim Gates was in Taiwan escorting 160 young students at the International World Year of Physics Young Ambassadors Meeting. Chuan Liu also returned from Taiwan, where he completed three years as President of Taiwan Central University. Dan Lathrop was recently in Moscow, where it was -25°C (-13°F), presenting results of his work in nonlinear dynamics research. Not to be outdone temperature-wise, a number of us were in Antarctica. This past December Eun-Suk Seo was in McMurdo on the coast of Antarctica launching the CREAM experiment and both Kara Hoffman and I made visits to the South Pole (Kara in January and me in February).

For me the trip was an incredible experience. Our research group is involved in the Ice Cube collaboration (<http://www.icecube.umd.edu>) --- an observatory being built and installed in the ice below the South Pole. This was my first trip to the Pole and I took advantage of it. Since US travelers to Antarctica leave from Christchurch, New Zealand, my wife and I took the opportunity to see the country and though we were only there for eight days, we had a great time. I also got some great pictures which can be seen below:

http://umdgrb.umd.edu/goodman/New_Zealand/index.htm

The South Pole was a completely unique experience. It was the end of a very successful season for IceCube as we installed eight new strings of optical modules bringing our total to nine and it was great to work on the commissioning of these strings. It was sunny (all the time – 24hrs a day), but cold, -45°C (-49°F). Even in these temperatures I managed to spend a good deal of time working outside. To view photos from my trips to the South Pole, visit:

http://umdgrb.umd.edu/goodman/South_Pole_06/index.htm

While the trips were productive and fun, it definitely feels great to be back in (relatively) warm College Park.

Regards,

Jordan A. Goodman
Professor and Chair



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Dear Readers,

Earlier this month, I naively thought I had a clear understanding of this department. If you came into the office with an inquiry about ISRs (Internal Services Request) or search candidate appointments I was capable of retrieving the information. Colloquia schedule? Had it. After a brief explanation, I could inform you on the guidelines for the CMPS Alum Awards. And thanks to Dr. Greenberg, I could even answer a few questions about CPT Symmetry. However, it wasn't very long before I realized that this department was simply not that simple. Welcome to Maryland Physics!



Every month, I'm introduced to another fellowship or grant that highlights the outstanding capabilities of our faculty, students and alumni. In February, Drs. Ouyang and Buonanno were honored with the Alfred P. Sloan Research Fellowship. This is an extremely competitive award, which is given to the very best, young faculty members to enhance their careers.

In addition, Willie Merrell wrote an insightful graduate blog, that introduced me to another side of research. I also spent some time conversing with alumnus Ajoy Mallik. His journey provided me, and I'm sure will provide several readers, with the endless possibilities after graduation. Although he was led into a life of business, it's reassuring to know that his Physics background continues to play an important part of his daily life.

All of our issues include educational articles that give us a better understanding of the researches going on in the department. This month, we were fortunate, to get updates on two. Douglas Hamilton wrote an article for the Research Spotlight that will inform readers on the Voyager 1 and Voyager 2 spacecrafts. In the letter from the chair section, Jordan fills us in on his trip to Antarctica. The research was successful and the photos he's returned with are beautiful and entertaining.

It appears as though completely understanding this department will take longer than four months. But honestly, these additional "lessons," have made this an enjoyable position.

Best,

Carole

CONTACT US



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The Photon Online is the official University of Maryland-Physics online newsletter. We release an issue monthly to highlight researches, alumni, awards, honors and events. The views and opinions of our readers are valued; please contact us with any questions, ideas or comments.

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