

Dr. Tony Phillips

News flash: You may be closer to interstellar space than you previously thought.

A team of researchers led by Tom Krimigis of the Johns Hopkins University Applied Physics Laboratory announced the finding in the June 2011 issue of *Nature*. The complicated title of their article, "Zero outward flow velocity for plasma in a heliosheath transition layer," belies a simple conclusion: The solar system appears to be a billion or more kilometers smaller than earlier estimates.

The recalculation is prompted by data from NASA's Voyager 1 probe, now 18 billion kilometers from Earth. Voyagers 1 and 2 were designed and built and are managed by NASA's Jet Propulsion Laboratory. Aging but active, the spacecraft have been traveling toward the stars since 1977 on a heroic mission to leave the solar system and find out what lies beyond.

To accomplish their task, the Voyagers must penetrate the outer walls of the heliosphere, a great bubble of plasma and magnetism blown in space by the solar wind. The heliosphere is so big, it contains all the planets, comets, and asteroids that orbit the sun. Indeed many astronomers hold that the heliosphere defines the boundaries of the solar system. Inside it is "home." Outside lies the Milky Way. For 30+ years, the spacecraft have been hurtling toward the transition zone. Voyager 1 is closing in. Much of Voyager 1's long journey has been uneventful. Last year, however, things began to change. In June 2010, Voyager 1 beamed back a startling number: zero. That's the outward velocity of the solar wind where the probe is now.

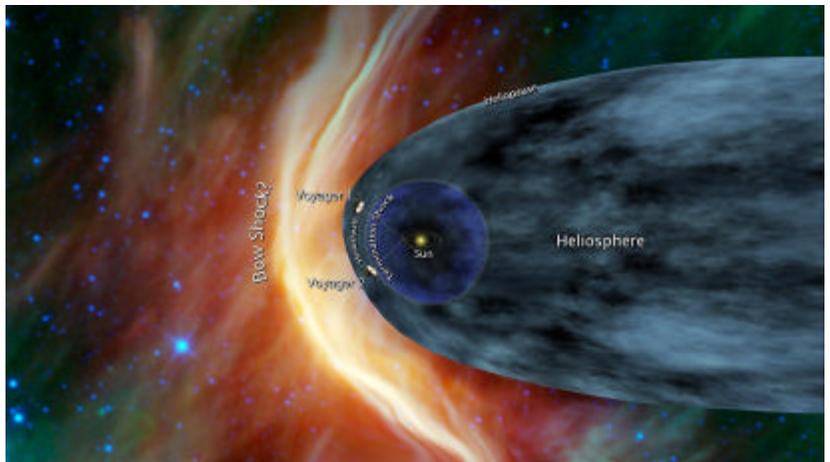
"This is the first sign that the frontier is upon us," says Krimigis. Previously, researchers thought the crossing was still years and billions of kilometers away, but a new analysis gave them second thoughts. Krimigis and colleagues combined Voyager data with previously unpublished measurements from the Cassini spacecraft. Cassini, on a mission to study Saturn, is nowhere near the edge of the solar system, but one of its instruments can detect atoms streaming into our solar system from the outside. Comparing data from the two locations, the team concluded that the edge of the heliosphere lies somewhere between 16 to 23 billion kilometers from the sun, with a best estimate of approximately 18 billion kilometers.

Because Voyager 1 is already nearly 18 billion kilometers out, it could cross into interstellar space at any time—maybe even as you are reading this article.

"How close are we?" wonders Ed Stone, Caltech professor and principal investigator of the Voyager project since the beginning. "We don't know, but Voyager 1 speeds outward a billion miles every three years, so we may not have long to wait." Stay tuned for the crossing.

For more about the missions of Voyager 1 and 2, see <http://voyager.jpl.nasa.gov/>. Another Voyager project scientist, Merav Opher, is the guest on the newest Space Place Live cartoon interview show for kids at <http://spaceplace.nasa.gov/space-place-live>.

This artist's concept shows NASA's two Voyager spacecraft exploring a turbulent region of space known as the heliosheath, the outer shell of the bubble of charged particles around our sun. Image credit: NASA/JPL-Caltech.



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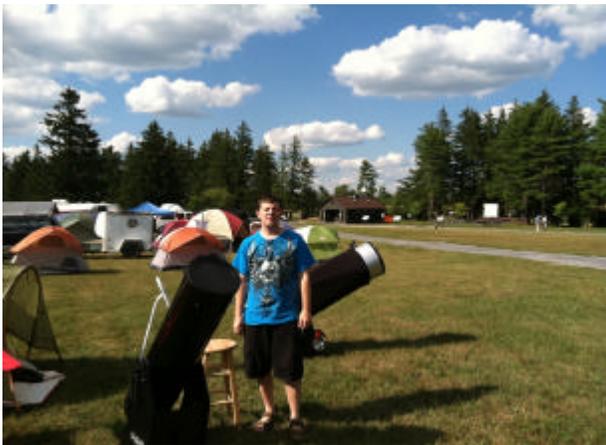
Michael Masciantonio



Early Saturday morning I left with a friend for a 6-hr drive to Cherry Springs State Park. This park has a protected DarkSky site with an astronomy field for camping out with your scopes and photography equipment. Cherry Springs is located at 2400 feet on the top of the mountain and is known for its Dark skies and great views. It is said that it is the darkest sky east of the Mississippi though there is a place in West Virginia that some say is slightly darker.

Upon arriving my friend and I unpacked the scopes and gear and setup camp. With the tent up and scopes in place it was time to collimate the scopes. Mine was quick and easy with a solid tube. We did a little more work to Pat's 14 inch truss scope bringin' his to perfection.

So it was around 3pm at this time and we decided to take a walk around and look at



the scopes around the field. There were some big scopes out there. After chatting it up a bit we ate our subs and talked with a good bunch of guys on the plot next to ours. After dinner Chuck, Karen and family arrived.

Finally all the gear and tents were up, we had my Orion XT10, Pats Orion xx14i and Chucks 16 Meade Lightbridge. and the sun was finally about to set!

Just as the sun was setting over the field we were treated to a very rare phenomenon known as crepuscular rays. This image looks something like what we saw. It was one end of the sky to the other and it was awesome. I wasn't near camp at the time and didn't have my camera in hand sadly.



After the rays we headed back to our camp and got ready for darkness.

The sun set and the stars started popping. We checked out Saturn which is getting low in the sky and saw a few moons. Before long Darkness had arrived. It was Breathtaking. The milky way was tree line to tree line and was like an arch over us the entire evening. It was so bright. You could see the bulge in the milky way extend all the way thru Scorpius. The detail was spectacular. You could naked eye many star clusters such as M6 and M7, the double cluster in Perseus, and M13 in Hercules. You could see with unaided eye Andromeda, and the Lagoon nebula. It was

like nothing I have ever seen before or imagined. We hit so many targets looking in all

My Latest Toy...

Don Surles

Yep...the economy is bad...the President and the Congress appear to be less than stellar leaders of our country. Life is not a dress rehearsal...this is not a drill or practice run.

So, when the opportunity presented itself for me to purchase another toy that I have never had I hopped on it. I am now the owner of a JMI RB-66. In case you don't know what that critter is...here goes. It is a 6" F-5 bino scope.

I found it on Craigslist and trekked to the hinterlands of central New Jersey to rescue it from it's non-astro onwer...actually he is a tube-type-stereo-phile. He also had in captivity a Barska 25-40X100MM bino and tripod...so I rescued that also. The Barska is probably a military grade Sino-Soviet era border patrol bino with a different paint job and the name Barska written on it. It weighs about 2.5X a consumer 25X100 bino...built for military service.

But, back to the JMI RB-66...This thing has six motors for alignment of the barrels, focusing, and establishing the inter pupillary distance. There is also 1 encoder for a JMI digital setting circles (one encoder is missing...so is the JMI Max controller). And the nice pretty white plastic covers that enshroud the bino are missing.

It operates off a 6vdc rechargeable battery; yep, the battery charger was missing also. So, I looked thru 15 years of AC/DC adapters in my adapter box (doesn't everyone have a box of AC/DC adapters?) and did not find one with the correct voltage and female connection. A trip to Radio Shack or to my trailer appeared necessary when my neighbor suggested trying the AC/DC adapter running my back porch radio...and it worked. Charging the 4.5 amp battery with a 700mw charger for about 8 hours put a full charge on the battery and voila! all the motors worked!

Deciphering how this bad boy is supposed to work has been interesting and amazingly simple now that I have navigated the collimation of each barrel, reset the interpupillary travel mechanism, brought the barrels together horizontally and then vertically...all so simple!

JMI has been very nice about helping me get this bino up and running. I can buy the missing parts, there is a user manual available from their website and I received the DVD today that explains how the bino works.

And now the weather has turned cloudy for the next few days. Stay tuned...I will bring it to the No Frills for e'ryone's enjoyment.

Oh, you should not leave the carrying case open if'n you have a cat...my Clyde de Cat really likes to scratch the foam insulation inside the case.

Don...

this is what the RB-66 should look like...



and this is what mine looks like...from top/rear...I also have the tripod.



from the front/top



directly over the top



from the bottom...



and here is the Barska bino...



a comparison of consumer 25X100 and the Barska 25-40X100

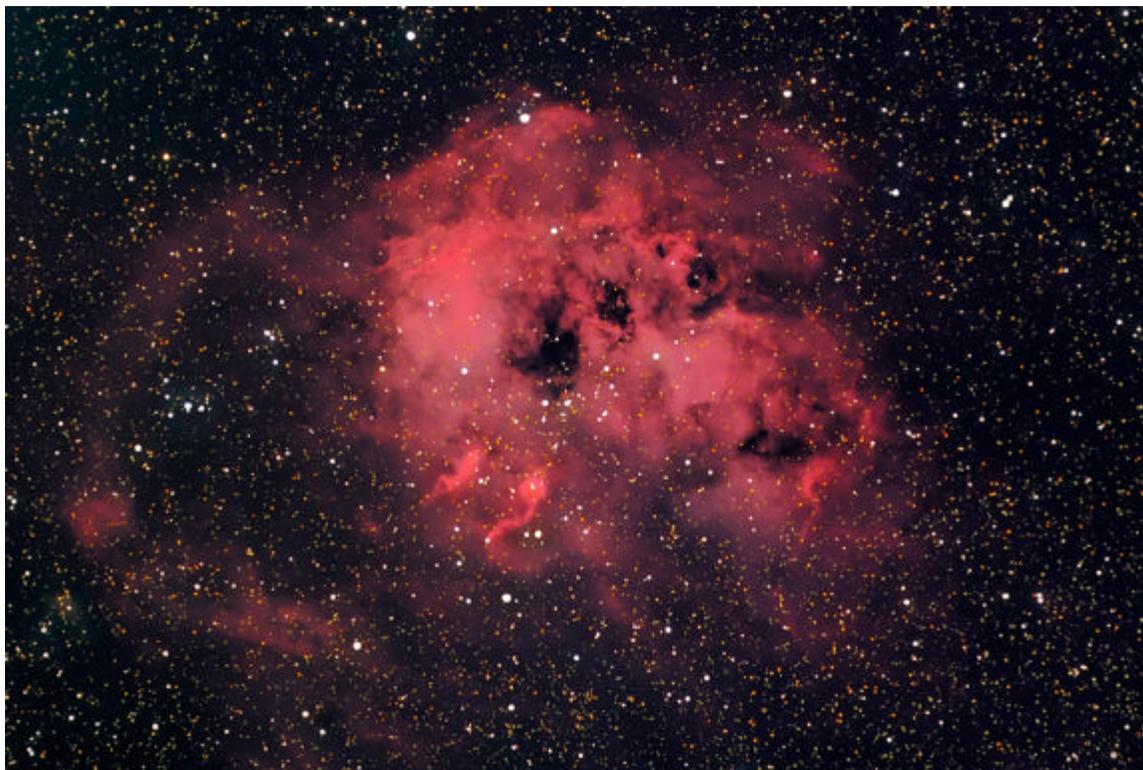


PoP Quiz.

You've been on Summer vacation, relaxing, soaking up the rays. The party's over. Time to exercise you noggin. See if you can answer these easy factoids. Those of you straining your brain can turn this page upside down for the answers.

1. Since its origin, Earth has rotated approximately _____ times.
2. _____ and _____ are the only planets that rotate clockwise.
3. With 63 moons, _____ has the largest number of moons.
4. Canis Majoris is so big that if our Sun were a ball 46in wide, Canis Majoris would be _____ wide.
5. The _____ is the most luminous star known - 10 million times the power of the Sun and as big as the size of Earth's entire orbit around the Sun.
6. _____ is the only planet not named after a Roman or Greek god.
7. _____ moon _____ has hundreds of times more oil and natural gas than all the known reserves on Earth.
8. A _____ star has such density that a teaspoonful of its matter would weigh more than all the people on Earth.
9. The pressure at the centre of the Earth is _____ per square inch.
10. _____ is tipped on its side so that one pole is pointed at the Sun, so its poles are warmer than its equator.
11. A cosmic year is the amount of time it takes the Sun to revolve around the center of the Milky Way, about _____ years.
12. A day on the planet _____ is twice as long as its year. _____ rotates very slowly but revolves around the Sun in slightly less than 88 days.
13. The star _____ is so big that 25 of our entire solar system would have to be placed end to end to equal the star's diameter.
14. The star _____ is so dense, a handful of it weighs about 1 million pounds.
15. The _____ contains over 99.8 percent of the total material (mass) in our solar system, while _____ contains most of the rest.
16. The Sun is _____ times larger than Earth.
17. A _____ is the strongest magnet in the universe.
18. A new star is born in our galaxy every _____.
19. A day on Mercury, from sunrise to sunset, lasts about _____.
20. A space vehicle must move at a rate of at least _____ to escape Earth's gravity.
21. The Sun loses _____ of material each day.
22. The _____ size ratio is the second largest in our solar system, after _____.
23. _____ on _____ is the largest volcano in our solar system, almost three times taller than Mount Everest on Earth.
24. The cosmos contains approximately _____ galaxies.
25. A large sunspot can last for about _____.
26. The Earth orbits the sun at an average speed of _____.
27. The moon is _____ the size of the Earth.
28. Sunlight takes about _____ to reach the Earth.

Answers: 1) 10^{15} , 2) Venus, Uranus, 3) Jupiter, 4) 1.3 miles, 5) Pistol Star, 6) Earth, 7) Saturn's, Titan, 8) neutron, 9) 27,000 tons, 10) Uranus, 11) 225 million, 12) Mercury, 13) Alpha Herculis, 14) Sirius B, 15) Sun, Jupiter, 16) 330,330, 17) neutron star, 18) 18 days, 19) six Earth months, 20) 17 miles per second, 21) 360 million tons, 22) Earth-Moon, Pluto-Charon, 23) Olympus Mons, Mars, 24) 50,000,000,000, 25) week, 26) 107,220 kms per hour, 27) 27%, 28) 8 minutes & 20 seconds



This is an image of the emission nebula IC 410 also called The Tadpoles. It's located in the constellation Auriga. Just below the dark dust cloud in the middle of the picture is the open star cluster NGC 1893. The image is a combination of images taken with my ST-10XME camera using the Ha, Clear, and RGB filters. The telescope used was an AP 130mm refractor and the location was the Astronomy Sky Village. This is a redo of my data using Tony Hallas' article in Astronomy Magazine July and August 2011 about incorporating Ha data into images. Joe Morris

A Good Read...

Recently, I was reading Bob Berman's column in ASTRONOMY magazine and he mentioned his new book, The Sun's Heartbeat, has been published and is available for our purchase and reading...hopefully.

Over the years I have read Bob's columns in DISCOVER and ASTRONOMY and found them to be interesting. He has a knack for presenting serious scientific information in an easy reading, interesting manner. Often he intersperses a bit of humor at the appropriate time to make the information a bit easier to comprehend. Bottom line, I decided to buy the book. Amazon.com was my choice...50% off the \$25.99 price and free shipping...I didn't have to go to the bookstore!

To date, I have read the first twelve chapters (there are 20). I find the book to be an easy read that is packed with interesting stories of how mankind's view of the sun has changed over time, how we have developed a science to understand the sun, and what we can/should expect in the coming years. The stories of the people who have put in their time and effort to understand our sun, and their trials & tribulations, add to the pure science they produced.

So, if you need a good book for those rainy days or cold moonlit nights here is one you may want to consider. Don

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