

Episode 21: Planet X

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Travis: Welcome to episode 21 of Slacker Astronomy. Every week or so we bring you a recent news event from the world of astronomy, and when there is nothing newsworthy to report, we'll play dead air and call it art.

Pamela: And give Phillip Glass a run for his money.

Travis: A few weeks ago Deep Impact made a splash by colliding with a comet. Even though the event was covered in almost all the media channels, we didn't touch it.

Pamela: We're waiting until some of the first scientific papers are published about what we learned from the collision. The modern press has done a good job of covering the hows and whys, but no one knows the whats yet. Once a few of those papers are published we'll do a show and fill you in. At that point the media will be bored with the story anyway.

Travis: But one story the media is not covering with much gusto is the recent detection of the so-called tenth planet. One reason is the lack of pretty pictures. It's just too far away to look like anything but a speck of dust on the lens. Not exactly cover girl material.

Pamela: Give me an airbrush and an hour with Photoshop and I'll make this new planet look like a skinny white girl with big hair. I'll have it on the cover of every magazine in the super market.

Travis: And name the planet something sexy, like Eros.

Pamela: Already taken.

Travis: Okay, Persephone. And come up with the Top Ten Ways to Turn On A Planet. And of course the obligatory planetary purity test, on page 169!

Pamela: Question #1: Has an asteroid plowed into you?

Travis: Question #2: Are you frigid?

Pamela: Question #3: Does your surface sublime when you heat up?

Travis: Question #4: Do you have more than one Moon at a time?

Pamela: There is a reason why the premier women's magazine is called COSMOPOLITAN.

Travis: Our mind is in the gutter this week. We were supposed to be talking about the 10th planet. Let's lighten up, or at least enlighten, this gutter with some **hard** science.

Pamela: So yeah, on July 29, 2005 astronomers announced they had found an object larger than Pluto in the outer edge of the solar system. This would be 10th planet was largely ignored by the major media . . .

Travis: Who like to focus on space craft like Deep Impact and Discovery . . .

Pamela: But this scientific discovery has sparked a debate among astronomers that isn't as much about science as it is about attitude and culture. And it is best told as a story.

Travis: Oh I like stories. (wishfully) If only I learned to read.

Pamela: Once upon a time there was Pluto, the 9th planet. It is very tiny — smaller even than the Earth's Moon. Then we discovered Pluto has a moon of its own, which is 1/3 the size of Pluto. The two orbit a point in space between then two bodies. Pluto has a thin atmosphere which is may share with its Moon, like a couple beneath a thin but cozy blanket. Pluto also has a wild orbit, which sometimes brings it closer to the Sun than its nearest neighbor Neptune.

Travis: In 1999, after the discovery of many small chunks of ice out in orbits similar to Plutos, an influential astronomer proposed calling Pluto both a planet *and* a minor planet. Asteroids are also called minor planets. His proposal caused lots of shouting and talking heads using big words in indignant ways. When all was said and done, nothing happened - as usual.

Pamela: The chunks of ice out near Pluto are called trans-neptunian objects, and they are part of a larger belt that extends out ward for no-ones knows exactly how many AU. This belt is named the Kuiper or Kuiper Belt, and its fridget members are called KBOs.

Travis: In 2002, a big object was discovered out in this belt. Named "kwah' war", it is about half the size of Pluto but far larger than all the other known KBOs at the time.

Pamela: Then a year later the people who discovered kwah' war discovered an even bigger object.

Travis: This object is two thirds the size of Pluto. Pretty big, but not a planet according to the discoverers - who prefer to call it a planet-*oid*.

Pamela: Kind of like humanoid.

Travis: Or hemerroid.

Pamela: Oh boy.

Travis: So there are lots of objects out there in the outer reaches of the solar system that are close in size to Pluto...

Pamela: Sedna, Kwah' war...

Travis: However, none was larger than Pluto. That is, until now.

Pamela: So, returning to July 28, 2005. On that media ignored day astronomers announced the detection of a new largest KBO. This object, called "EL 61" for now, is *three fourths* the size of Pluto.

Travis: When it rains, it pours. The very... next... day ...the people who discovered kwah war announced the discovery of an object that is actually *bigger* than Pluto. This object is called "UB 313" for now. The discoverers announced it as the 10th planet and some media, including slackerastronomy.org, went with it.

- Pamela: The discoverers are a team headed by Michael Brown and includes Chad Trujillo (truhillo), and David Rabinowitz. Brown says on his web site quote:
- Travis: "From now on, everyone should ignore the distracting debates of the scientists, and planets in our solar system should be defined not by some attempt at forcing a scientific definition on a thousands-of-years-old cultural term, but by simply embracing culture. Pluto is a planet because culture says it is. "
- Pamela: End quote. Slacker Astronomy agrees with this. It would be impossible to remove the planet moniker from Pluto. Linguistics is not scientific, it is cultural and it evolves in a chaotic way outside of anyone's control.
- Travis: Except maybe Oprah's.
- Pamela: The definition of the term planet has already changed significantly from its original meaning, which was wanderer. Culture cannot be fought or hemmed in by a scientific desire for classification. So what do we do about the new object, which has no cultural history to guide us?
- Travis: Brown suggests we use the size of Pluto as the benchmark and anything larger should be a planet too. So UB313 gets to be called a planet. This has the added benefit of being a pretty high standard to meet so it is possible, maybe even likely, there won't be any more planets discovered. So this would truly be an historic moment.
- Pamela: On the evening of the announced discovery, July 29th, Aaron recorded a 20 minute interview with Dr. Chad Trujillo. Trujillo had this to say about the discovery of future planets.

(aaron will give a quote where he talks about how they surveyed most of the sky and would have picked up any more planets of Pluto size or larger already)

- Travis: So what is this new world like? Not surprisingly, it seems to be a lot like Pluto. Its surface is dominated by methane ice. A comparison of Pluto's and UB313's spectra is available in the Show Notes at slackerastronomy.org.
- Pamela: The orbit of the planet is extreme. Right now it is at the farthest reaches of its orbit, around 10 billion miles from the Sun and 3 times as far away as Pluto. Its year lasts around 558 Earth years and for part of that year it will actually be closer to the Sun than Pluto. This is because the orbit is shaped more like an ellipse than a circle.
- Travis: Most of the planets and objects in our solar system orbit in the same plane. This is believed to be because they were formed from the same swirling cloud of dust in the early days of our solar system. It is like the way pizza dough flattens out when you spin it from a ball.
- Pamela: UB313's orbit is inclined by as much as 44 degrees from the planetary plane. This is one reason why it took so long to find it. Astronomers didn't expect to find anything there so didn't spend much effort in that region.

Travis: The extreme orbit may give us a clue as to the history of UB313. Since it likely did not form in its current orbit, it must have wandered into that orbit sometime after the solar system formed. One theory suggests a star passing near our solar system disturbed its orbit. Another says it may once have been a moon to one of the outer planets that was tossed out by Pluto's gravity. There are lots of theories and many papers will undoubtedly be written about more.

Pamela: Put any five theorists in a room, add a question and shake, and get out 8 theories.

Travis: 8 mutually exclusive theories.

Pamela: The diameter of UB313 is estimated to be around 2,860 kilometers, which makes it around 25% larger than Pluto. The estimate is based on its photometric brightness combined with how much light we think it reflects.

Travis: We're guessing it is about as reflective as Pluto.

Pamela: However, UB313 is grayer in color than Pluto. So it could in fact be reflecting less light which would make it even larger.

Travis: Further observations and spectroscopy will be needed to narrow down that estimate. And you can bet astronomers are writing observing proposals as we speak to do just that.

Pamela: The object was first discovered in January. In between its discovery and the time it was announced, Brown and his team attempted to observe it with the Spitzer Space Telescope, which as an infrared telescope is sensitive to heat. However, they were unable to detect it because it was just too cold for the specific instrument they used with Spitzer.

Travis: Thus SA proposes to name the planet "Phantom". Or better yet, "Space Ghost".

Pamela: Oh, be some other name! What's in a name? that which we call a rose, By any other name would smell as sweet.

Travis: So where do we go from here? Now the International Astronomical Union, also known as the IAU, gets to determine a name for the object.

Pamela: Brown and his team have submitted a name based on a creation deity of some mythology. They are keeping the name private until the IAU's Nomenclature committee approves it.

Travis: As for calling it a planet or not, the IAU doesn't really have to do anything. If they want they can ignore the issue and let the future stakeholders sort it out. Kind of like how congress ignores the budget deficits.

Pamela: Or they can decide on the issue and give it a formal designation beyond the name. It is unclear what will happen. Our guess is that a name will be decided soon since that is easier. Then the planet decision will be withheld until the next General Assembly of the IAU to be held in Prague a year from now. Slacker Astronomy is hoping to be at this meeting and will report on it. But even if we aren't, the press will surely be all over this issue.

- Travis: If you would like to hear our entire interview with Dr. Trujillo you can find it on our website or via the Slacker Astronomy Extra feed. We originally posted it to our main feed last Friday since it was newsworthy. So a few of you may have already heard it. In our show notes we will put lots of links to more information about UB313. And for some background on Pluto, check our July 25th episode about Pluto and its moon Charon.
- Pamela: For more information on how planetary systems form check out the Universe Today podcast by friend-of-the-show Fraser Cain. His latest podcast interviews an astronomer studying the evolution of planetary disks. Find it at universetoday.com in the audio section or use the link in our show notes. Fraser is cool, he interviews awesome astronomers who don't split their infinitives.
- Travis: The Slacker Law of Relativity: The amount of energy emitted by a split infinitive is equal to that of an English professor's rage accelerated to the speed of light squared.
- Pamela: Thanks for listening to another episode of slacker astronomy. Send feedback and e-mail bombs to info@slackerastronomy.org. On behalf of Travis and Aaron, I'm Pamela Gay.
- Travis: This has been Slacker Astronomy, a podcast for you, for fun, for the voices in our heads.