

**Program: Tidal Forces**

**Volume 26, No.12**

**April 2021**

**Greg Smith – editor.**

**Meeting: April 21, 2021**

**Zoom 7:00 p m**

## Looking Around

I was hoping to talk about the flight of Ingenuity, the helicopter that is now on Mars. Unfortunately, or fortunately JPL discovered a software problem in the flight control system and is resolving the issue as I write this article. If we are lucky the drone helicopter will be flying by the time we meet this week.

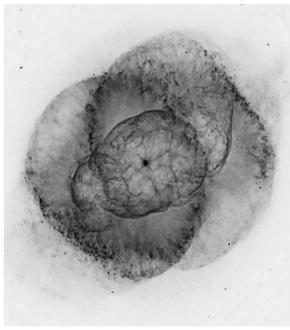
Has anyone been watching the most volcanic planet in the solar system? Go to YouTube and type in “Iceland volcanoes”. It has been incredible to watch this fissure open up and create these spouting vents and watch the lava fill in a valley. The chat stream that goes with a couple of these YouTube channels is very interesting as people from all over the world comment and explain what is going on. Our afternoon is their evening. The night views are mesmerizing. I found myself watching for hours as streams of lava flow over a hillside and down into a valley. An estimated 10,000 people hiked for an hour or so to watch the first vent when it opened from a hillside across from the vent. The next week, a second vent opened, and the lava flowed over the camera and viewing area. The viewing area had been closed off when the second vent started opening. The whole area has been pretty much closed off as six new vents opened up. This eruption has been going on now for a month. The volcanologists have no

idea when it will stop. They say it can last till tomorrow or for decades. The magma that feed it is straight from the Earth mantle and not a magma chamber as the more explosive types of volcano’s like Mt St. Helens. Since Iceland is located on the mid-Atlantic ridge, the Earth’s plates are widening here and not subducting like here in the eastern Pacific. Hence, this volcano has an unlimited supply of magma to feed from.

While this was going on in Iceland, a volcano erupted in the Caribbean, one in Guatemala, and one in the Philippines. We are a very active volcanic planet. The moon’s tidal fluctuations are a part of the reason the plates stay active. Which is also part of the reason there is life on our world.

We’ve had some really nice nights lately, with comfortable weather and all. For me, I am recovering from cataract surgery. Using cheap ‘cheater’ glasses are not much help at all. I can barely use them to type on a computer to write this article and my eyes are not stable enough yet to use binoculars let alone a telescope. I hope you have made good use of the beautiful moonless nights to do some observing of your favorite objects or explore some new things in the spring sky.

*Every Day is a Star Filled Day,  
Every Night is a Starry Night*



# A-Bombs & Super Nova's



## **Supernova deaths of white dwarf stars may explode like a nuclear bomb.**

By Charles Q. Choi, Space.com.

### **Who knew star deaths and nuclear weapons had something in common?**

When a white dwarf star explodes as a supernova, it may detonate like a nuclear weapon on Earth, a new study finds.

White dwarfs are the dim, fading, Earth-size cores of dead stars that are left behind after average-size stars have exhausted their fuel and shed their outer layers. Our sun will one day become a white dwarf, as will more than 90% of the stars in our galaxy.

Previous research found that white dwarfs can die in nuclear explosions known as type Ia supernovas. Much remains unknown about what triggers these explosions, but prior work suggested they may happen when a white dwarf acquires extra fuel from a binary companion, perhaps due to a collision. (In contrast, type II supernovas occur when a single star dies and collapses in on itself).

Now researchers have suggested a new way that type Ia supernovas might happen — a white dwarf may detonate like a nuclear weapon.

As a white dwarf cools, uranium and other heavy radioactive elements known as actinides crystallize within its core. Occasionally the atoms of these elements spontaneously undergo nuclear fission, splitting into smaller fragments. These instances of radioactive decay can release energy and subatomic particles, such as neutrons, which can break up nearby atoms.

If the amount of actinides within a white dwarf's core exceeds a critical mass, it can set off an explosive, runaway nuclear fission chain reaction. This outburst can then trigger nuclear fusion, with atom nuclei fusing to generate huge amounts of energy. In a similar fashion, a hydrogen bomb uses a nuclear fission chain reaction to detonate a nuclear fusion explosion.

The new study's calculations and computer simulations found that a critical mass of uranium can indeed crystallize from the mixture of elements usually found in a cooling white dwarf. If this uranium explodes due to a nuclear fission chain reaction, the scientists found that the resulting heat and pressure in the white dwarf's core could be high enough to trigger fusion of lighter elements, such as carbon and oxygen, resulting in a supernova.

So how many type Ia supernovas might this new mechanism help explain? "Perhaps about half," Horowitz said.

Specifically, these new findings might explain type Ia supernovas that happen within a billion years of a white dwarf's formation, as their uranium has not yet all radioactively decayed. When it comes to older white dwarfs, type Ia supernovas might happen through mergers of two white dwarfs, Horowitz said.

Future research can include running computer simulations to pin down whether fission chain reactions in white dwarfs can trigger fusion, and how this happens. "There are many different

physical processes going on during the explosion, and therefore there are many possible uncertainties," Horowitz said. Such work could also reveal ways to detect whether or not any type Ia supernovas occurred because of this newfound mechanism.

Horowitz and study co-author Matt Caplan, a theoretical physicist at Illinois State University, detailed their findings online March 29 in the journal Physical Review Letters.

## **Minutes of the March Meeting**

Ted Gruber opened the meeting at 7pm and welcomed the 14 zoom attendees.

Greg Cermak, Roy G., Ted G, Carolyn H., Erik Kaarto, Becky K., Howard K., Tom & Mary M., Colleen Neel, Bill Norvell, Steve P., Chuck R., Greg S., and Mark T.

### **The Program : Black Holes. By Greg Cermak**

Greg gave a detailed presentation on the research going on about the formation of Black Holes and how they form. Recently astronomers have been able to create a 'picture' of the accretion ring of a black hole using eight radio telescopes simultaneously around the world.

The sky report is available on the clubs website,

Business meeting:

It looks like we can now start meeting in person at the April Meeting.

Mike Fiest has offered to host the first meeting at his home. He will present some of his astronomy toys that helps make his viewing easier and fun. Bring your own lawn chair and snacks.

Election of officers is this next month, as we start a new 'year' for our club.

We have the use of the Willow Grove park picnic area again this year. We will have the picnic on June 20<sup>th</sup>, a Saturday. Hopefully, we can have a public viewing of the sun and moon after the picnic.

Greg Cermak has offered to do a first light program about the James Webb Space Telescope late this fall as soon as the material is available.

There is an online class on **Coursera** called Black Holes – 101. It's free.

We welcome a new member : Bruce Prickett.

### **☞ April 2021 Meeting ☞**

DATE: **Wednesday April 21, 2021**

TIME 7:00pm

PLACE: Zoom

PROGRAM: **Tidal Forces. Steve Powell**

Drinks : Your Choice

Snacks : Whatever is in your Cupboards

## Friends of Galileo Club Officers

PRESIDENT	Ted Gruber
VICE-PRESIDENT/ PROGRAM CHAIR	Mark Thorson
SECRETARY	Greg Smith
TREASURER	Steve Powell
WEBSITE	Ted Gruber
NEWSLETTER ED.	Greg Smith
ALCOR	Tom Meek

## Next Month's Newsletter Deadline

The deadline for items in next month's newsletter is:  
**Wednesday: seven days before next meeting.**

**Please feel free to send in your thoughts and experiences about your astronomical adventures.**

Submit your material by E-mail to: [gryth@msn.com](mailto:gryth@msn.com)

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 Longview, WA

