The coolest White Dwarf—older than the age of the universe?

Ronald G. Samec

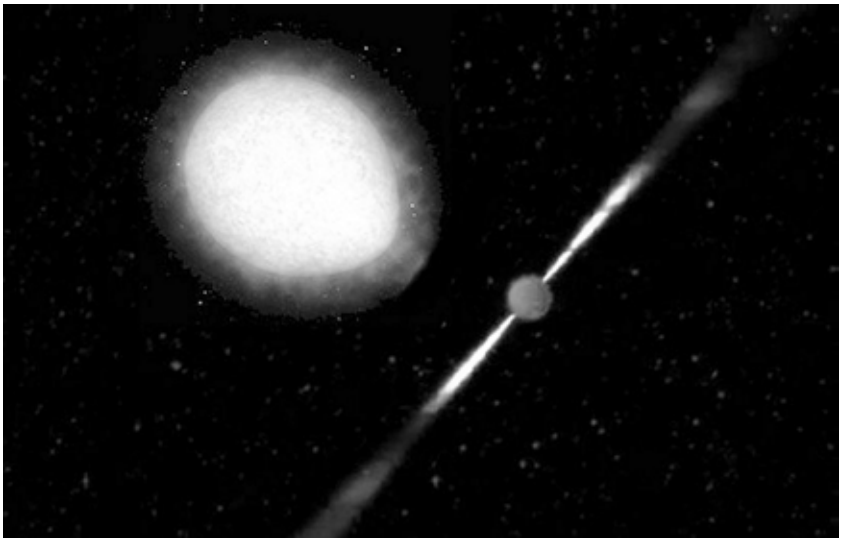

Figure 1. A White Dwarf and pulsar star binary. However, the White Dwarf in the present article is much darker.

The discovery of an IMBP (Intermediate Mass Binary Pulsar, see figure 1) was reported in the *Astrophysical Journal*.[1] A pulsar is a neutron star that is the remnant of a compact core of a star emitting two flashes of light on each full rotation due to its strong bipolar magnetic fields. These flashes of light are emitted in north-south directions. This beam of photons is produced from accelerating electrons spiralling in intense magnetic fields. The surface magnetic field of the present pulsar is some 7.2×10^9 Gauss as compared to the earth's 0.25–0.65 Gauss. The double flash (see figure 2) is due to the fact that the pulsar's two beams along magnetic axes are misaligned with the poles of rotation. The earth observer sees a stronger flash from the beam which is pointed nearer the earth than the other. So, two flashes result in each full rotation.

Pulsars vs White Dwarfs

Pulsars are thought to arise from a supernova explosion which is due to an acoustic shock occurring deep within a massive star. The inner part of the star compresses until protons and electrons merge into neutrons creating a neutron star and the outer parts of the star blow outward and away from the star. The magnetic field of the star compresses into the compact core, making the intense magnetic field. This star had a companion, probably thought to be larger than the sun (but not massive enough to result in a supernova), which reached its last stages of life when it did not have sufficient fuel to continue its nuclear burning processes. In this case the theory says that the star steadily loses its outer gasses and ends its life as a ball of compact degenerate electron gas or a White Dwarf (WD). It may begin this stage with a very high temperature, say 50,000 K and it steadily cools over time following a well-known cooling rate. Eventually this object will cool so much that it will become a 'black dwarf' and will be disguised from observation as dark matter. However, this requires much more time than the age of the universe! This neutron star has a rather low mass of 1.2 solar masses and the WD 1.05 solar masses. The orbit is nearly edge on and the period of orbit is 2.4 days. The spin (rotation) period of the neutron star is rather long; 0.03 seconds.

Problem 1—the orbit

One of the problems in this binary system is its low eccentricity. It has a near circular orbit. A supernova explosion happening nearby would certainly give an impulse to the orbiting star disrupting or ejecting it completely or at least adding energy to its orbit, making it more eccentric. In fact, Type 1a supernovae are thought to completely annihilate after such an explosion.

Problem 2—the white dwarfs invisibility

But, the major trouble for evolutionary astrophysicists is that the White Dwarf is too faint to be observed with a magnitude >19.1. This makes it cooler than 3,000 K, the coolest WD on record! This is an upper limit. Other considerations give an upper limit as low as 1,700 K. It has to be a crystalized WD (or 'black dwarf' since it is optically invisible). For this to be the case it is probably older than the Milky Way (11 Ga). In fact the characteristic (spin down) age is 33.8 Ga old, much older than the universe (13.8 Ga) by a factor of 2.44 times! Much work is done by the journal authors to force its age into the limiting age of the Milky Way!

The biggest problem—time

Another consideration is what was the time needed to become a White Dwarf? This must be added to the cooling age. The authors assume it

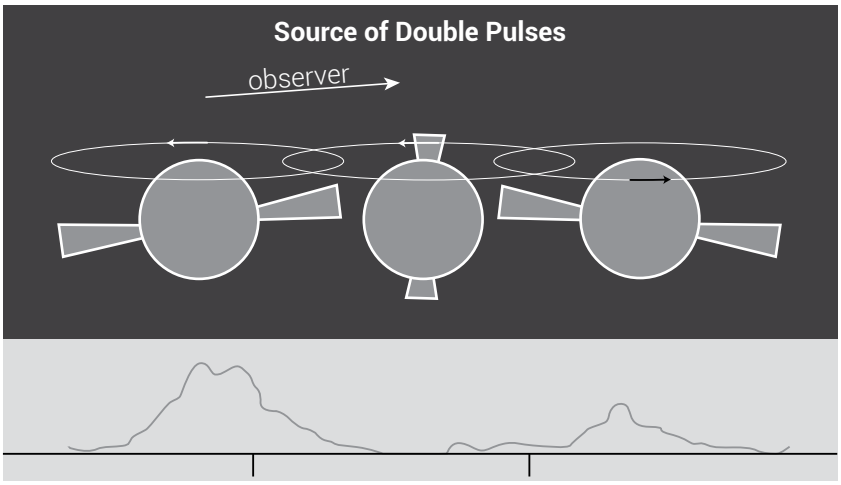

Figure 2. The pulsar has two beams along magnetic axes which are misaligned with the poles of rotation. The earth observer sees a stronger flash from the beam which is pointed nearer the earth than the other. So every rotation results in two flashes. The bottom plot is the observed light curve of the effect.

to have a rather high beginning mass of 6 solar masses. At this mass, the star could become a WD in 70 Ma. The authors must also be hoping that this object is among the first stars (population III), in which case, why are they applying the theory of normal stars in the galaxy to it (population I and II)? Another interesting idea that follows from this paper is that White Dwarfs become dark matter at below ~3,000 K! Thus, the neutron star is essentially being orbited by a dark matter star!

This situation highlights the problem of the cosmological ages in the universe. The 13.8 Ga scenario is obviously wrong even in creation time dilation based scenarios. Creationists have a real job sorting it out. One of the questions that need answering is: 'Are time dilation theories warranted?' This is still an open question. However, the idea that God created WDs is analogous to the idea that He created fossils in the ground, so they never actually lived and died. Thus they are a false history and any information they could lend to such creation topics as the Flood history and their historical appearance in the fossil record are moot.

White Dwarfs tell us their past history

WDs likewise give us information about their past lives. For example, the type of WD gives us information about their earlier state (initial stellar mass). They are leftover remnants of low-to-intermediate mass stars. Low mass stars end up as Helium WDs. Solar type stars end as Carbon-Oxygen WDs. Stars on the higher end of the masses in question, as indicated in this paper, end as Oxygen-Neon-Magnesium WDs. (Of course, the authors can only interpret the type by the binary companion mass.) WDs are essentially 'fossil stars'. They have used up their fusion fuels and have lost their atmosphere and are left with degenerate electrons, slowly cooling over time. I believe that God did not create 'dead' stars.

On the other hand, if time dilation has operated, then the stars actually existed as normal stars and they have lived out their lives and ended as WDs. The information is scientifically accurate and no false history is conveyed by their appearance. Only the observer on the earth has observed them from a frame where time has slowed, so that these events *appear* to have all happened in a brief time (inside a time period of less than 10,000 years). This all occurred in the past but how long ago did it happen in the *objects* time frame?

Conclusion

The ages used by modern day astronomers are evidently wrong since they are based on evolutionary assumptions (the main one being the age of the sun which rests on radiometric dating of the 'oldest' meteorites). Creationist astronomers need to determine the apparent age of the cosmos by measuring ages of objects using alternate dating techniques that are readily confirmed (like orbital periods). That is the path I have taken.[2] My present research is pointed at the apparent evolution of binary star orbits. Their 'evolution' is found to be occurring much faster than what would be expected from theory.

References

1. Kaplan, D. L., Boyles, J., Dunlap, B.H., Tendulkar, S.P., Deller, A.T., Ransom, S.M., McLaughlin, M.A., Lorimer, D.R. and Stairs, I.H., A 1.05 M &sun: Companion to PSR J2222-0137: The Coolest known White Dwarf? *The Astrophysical J.* **789**(2):119, 2014.
2. See e.g. Samec, R.G. and Figg, E., The apparent age of the time dilated universe I: gyrochronology, angular momentum loss in close solar type binaries, *Creation Research Society Quarterly* **49**:1, 2012.