Could Barnard's Star Be Our Sun's Companion?

The Fastest Star in the Sky - May Soon Be Our Closest Too!

In 1894, the Indian astronomer, Sri Yukteswar, wrote that our sun was part of a "dual star" system, with an unnamed companion. He pegged the orbit period at about 24,000 years saying the moving equinox (precession observable) was actually an artifact of the binary motion. He estimated apoapsis, when the two stars were farthest apart, at 500AD, and predicted periapsis, closest proximity, at about 12,500AD.

Barnard's Star, a red dwarf, was unknown at the time, not discovered until 1916. Thus 22 years after Yukteswar's prediction, the fastest moving star in the sky, invisible to the unaided eye, was found by Edward Emerson Barnard. Recently, its trajectory has been calculated to show a close approach to the sun in 11,800AD (+/-10%), which fits neatly with Yukteswar's predicted date. In fact, Barnard's Star will then be nearer to our sun than any current star!

For Yukteswar to be right about "our dual star" being the cause of the "backward motion of the equinoctial point", that star must sit close to the celestial equator, otherwise it could not produce the precession of the equinox observable (a sun moving through the constellations that straddle the celestial equator). I never thought about this much until realizing that Barnard's Star sits right on the celestial equator with a declination of less than 5 degrees.

There are a lot of reasons to question whether or not the Sun has a companion star. Even one making its closest approach at 3.75 light years would still seem far too distant to be gravitationally bound, or to orbit around a center of mass (with our sun) in just 24,000 years. However, Barnard's mass is only about 15% of the sun's mass, which would put the center of mass between the two objects (if they are gravitationally bound) at well under one light year. So maybe it is not such a big stretch after all.

One way to tell if Barnard's might be our sun's companion, causing the phenomenon we call the "precession of the equinox", is if that observable were speeding up. We know this because of Kepler's laws: any two bodies in an orbital relationship would accelerate as they leave apoapsis on their way to periapsis. In fact, this is exactly what we see with the precession observable - it is speeding up. In the late 1800's, before anything was known of Barnard's Star, the great astronomer, Simon Newcomb, offered a constant as an input to the precession equation to correct for the unexplained acceleration in its rate. If the precession observable were really the observable of our solar system in motion, then a steady increase in the rate of precession is exactly what we would expect at this point in our orbit.

When I ask my physicist friends if our sun could be gravitationally bound to another star, they either say, 1."No, if we were in a binary star system we would know it by now", or 2."No, because it would have to be with our closest star, Proxima Centauri, and its not even on a plane that could produce the observable of a sun moving through the zodiac".

In answer to #1, I would argue we do not "know it by now" because we have *constrained* the sun to a fixed position by allocating all of its 50 arc seconds of visible motion to a wobbling earth axis. If the earth's axis only wobbles an arc second or two (as our lunar equations show) then there are nearly 50 arc seconds of solar system motion still to be accounted for!

This idea that the "sun cannot move" dates back to Copernicus who said the sun's motion was an illusion caused by a wobbling earth axis. He needed the sun to be fixed for his new heliocentric solar system to work. He could not imagine that it could both be the center of our

“universe”, and move! Newton liked this idea, and said only the sun and the moon could cause a wobbling axis. But his lunisolar equations never worked. Ever since our dynamists have been trying to patch them up adding thousands of variables (often inconsistent with dynamical theory) while never explaining why the precession rate accelerates. Is the moon drawing closer to the earth, or the earth drawing closer to the sun? No, the lunisolar theory is broken!

Regarding point #2, we have only recently learned that Barnard’s will soon move closer to our sun than the Alpha Centauri system. Thus Barnard’s will soon meet the “closest” test. More importantly, it is on the right plane to produce a precession-type observable.

While I hope my friends will now be more understanding, I don’t think they will easily accept that both Copernicus and Newton could have been wrong about the sun’s motion. Yes, we can all see it moves 50 arc seconds across the sky per year, but the great renaissance minds told us it can’t, so who are we to argue? As Bernard’s Star races ever closer to our sun, no doubt some will start to wonder why. Maybe then will old assumptions die.

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