

Lyra: Cosmic Background

Intro

Jordan: [Music]

Jordan: [Music] Hi, I'm Jordan.

Kit: And I'm Kit.

Jordan: Welcome to On Starry Time, where stars plus lines

Kit: equal stories.

Jordan: For this month, we will be exploring the constellation Lyra, the Lyre.

Kit: This week's episode will be focused on the astronomy and other cosmic background of this constellation.

Background

Jordan: Lyra is one of the smaller IAU recognized constellations. Comprises only 287 square degrees. It is the 52nd largest out of the 88 recognized IAU constellations. So not large.

Kit: Not large, but as we'll discuss throughout this episode, it still has a lot of things going on. But this constellation is one of Ptolemy's great

Jordan: great great great great great

Kit: 48 constellations identified in the second century.

Jordan: This constellation is sometimes drawn in star maps as a lyre carried by a vulture or eagle, which is likely the result of Greco- Roman star lore merging other stories of this part of the night sky from other cultures.

Kit: Yes, a very classic example, uh, of the interpretatio graeca, which is that tendency to adapt, assimilate, steal, merge all these cultural stories into the Greco- Roman mythos.

Jordan: And we'll definitely talk more about what other cultures saw in this part of the night sky when we get to our myths and retcon episode next week.

What it Looks Like and Where to Find It

But for now, let's talk about what this constellation looks like and where to find it. What did this one look like to you, Kit?

Kit: Uh, this. [laughter] Not in a great while have I looked at the constellation and, like, could not see anything. It was just shapes. I was like, there's a triangle shape. There's a parallelogram. Um. Sometimes when that happens, I leave the IAU drawings and I go

to, like, just looking online broadly, and I just. I couldn't make it look like anything. Not a lyre, not a harp, nothing. Ummmm, I got. I was very stumped. How about you? Could you make anything out of this one, Jordan?

Jordan: Kit. Yeah. I couldn't stop seeing things with this constellation. First I saw what looked like maybe like an old timey sleigh. I saw something that looked almost like a lute or a guitar, some sort of weird medieval instrument. I saw in one diagram, it almost looked like a crystal hourglass type of form. Lots of different interpretations based upon what stars they made the brightest in what I was looking at.

Kit: So despite being both small and sort of vague in shape, it's actually very easy to find this constellation in the night sky because it is home to a very, very bright star, the star Vega, which we'll do a medium dive on shortly.

Jordan: Oh, give yourself some credit. It's a mid to deep dive. Okay. All right. Aside from finding Vega or Cygnus, which neighbors Lyra, you can locate Lyra in the night sky using its celestial coordinate. It has a right ascension of 18 hours and a declination of positive 40 degrees.

Kit: And it is a northern hemisphere constellation that's high in the northern sky in the summer, but it's technically visible between positive 90 and negative 40 degrees latitude here on earth.

Brightest Star

Jordan: So now we know where to find it. What it looks like is a little bit harder to define,

but finding Vega, that's easy because it's one of the brightest stars in the night sky.

Kit: Absolutely. It is 25 light years from Earth and it is actually the fifth brightest star in our entire night sky and the second brightest in the northern night sky.

Jordan: All right, Bayer, if you didn't get this one right, I'm going to have a lot of questions. So how do did he do, Kit?

Kit: So the Bayer designation of Vega is Alpha Lyrae. So, yeah, Bayer gets a W.

Jordan: Get the easy ones, my guy. It's how winning records are built. Respect.

Kit: We're very proud of our good friend Johann Bayer.

Jordan: Extremely proud.

Kit: So Vega is part of the summer triangle asterism, along with Altair, which is in the constellation Aquila, which we haven't talked about. And the third member of that triangle is Deneb.

Jordan: And we talked about Deneb last month. So if you want to learn more about that star, check out our cosmic background on the episode Cygnus.

Kit: So as a very bright star in our night sky, it's probably not surprising that Vega's apparent magnitude is

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Kit: positive 0.03. It is a blue tinged white star that is on the main sequence. And it's an A type star, but it's about twice as massive as our sun. And while it's younger than our sun, both of these stars, our sun and Vega, are about halfway through their life on the main sequence.

Jordan: Right. And that's, of course, because massive stars burn through their fuel much faster than smaller stars.

Kit: Yeah, exactly. And so, as I said, Vega has about twice the mass of the sun, so it's going to have a shorter lifetime.

Jordan: Vega glad we got to know you when we did.

Kit: Well, don't worry. Uh, we still have plenty of time with Vega. And in fact, it's going to once again become our north star in the year 13,727 CE. And then at some point, it will become a white dwarf.

Jordan: Thank goodness it's at least going to be around that long.

Kit: At least from our perspective. So Vega is a star that's been studied pretty extensively. And it was the first star after our sun to be photographed and to have its spectrum analyzed. So in order to keep the show moving, I decided that maybe I would just focus on three fun facts that I thought were most interesting about Vega. Does that sound good?

Jordan: That sounds great. And we'll be definitely sure to post some additional resources on our socials, which are Starry Time Pod on the Universeodon server of

Mastodon. And we do have a presence on Twitter.

Kit: Definitely. We'll be sure to post those. So here we go. Fun fact number one, Vega has a circumstellar dust ring around it, which astronomers think might be similar to the Kuiper belt in the solar system. Fun fact number two, Vega rotates faster than the sun and actually rotates at a rate similar to Jupiter or Saturn, which actually makes it less of a sphere shape, right, because it's rotating much faster and more of a sort of oblate spheroid. So it's not perfectly spherical.

Jordan: All right, give me your last top interesting fact.

Kit: So the final fun fact, which I think is most interesting is that Vega has a unconfirmed companion star and potentially has at least one planet. The planet that they have sort of speculated about and done calculations around is, if it exists, it's about 22 times the mass of the earth. And the problem with identifying this planet is that based on their calculations, the calculations from astronomers, it's orbiting extremely close to the star. It is so close to Vega that a year on this star [editor note: should be planet] is two and a half Earth days. And the planet would as a result be over 5000 degrees Fahrenheit.

Jordan: Wow. It's gotta be some kind of like super hot gas giant or something, right?

Kit: Yep. So they have suggested astronomers call it either a hot Neptune or a hot Jupiter. But this is so wild because think of a Jupiter or even Neptune sized planet orbiting our sun closer than Mercury.

Jordan: Yeah, significantly. Ah, yeah. That's honestly crazy. Crazy. Yeah. All right. I think you definitely did save the best one for last. I hope this planet does exist and I can't wait

to learn more about it if we ever find out some more information.

Kit: Yeah, I'm definitely looking forward to learning and hearing more about it as the astronomers keep doing what they do. Another bonus is that Vega is the origin of the extraterrestrial message in both the movie and also, of course, the book Contact. So that's another, like, fun fact about Vega.

Bayer's Variable Star

All right, so let's move to our next segment Bayer's variable star, where we follow the Greek alphabet to learn more about the Bayer designated stars in the night sky. This month, you actually took charge of this segment, so where did we leave off? What's going on with this segment?

Jordan: We were on Nu Lyra.

Kit: Mhm.

Jordan: But I swerved, because even though Nu Lyrae is actually the name for two stars in this constellation, because astronomer John Flamsteed was out of control, they're both just kind of, meh. I can't say I had much to say about Nu Lyrae.

Kit: Wow. Okay. Brutal. Just out on both of the Nu Lyrae stars.

Jordan: I'm, um, out on most of John Flamsteed's work, to be honest. Johann Bayer, he is not. I'll just leave it at that. No disrespect to the main sequence stars of the world, but

I did want to give a quick shout out to Beta Lyrae, also known as Sheliak.

Kit: Well, this better be good, because you are breaking the rules.

Jordan: Big time rule breaker over here. Beta

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Jordan: Lyrae is actually a multiple star system, and it is pretty far away. 960 light years. And the brightest component, Beta Lyrae A is a triple star system with an eclipsing binary star system orbiting a third single star.

Kit: Okay, so this is interesting. Eclipsing binary stars are binary stars, obviously, that orbit one another in such a way that we seem to see them undergoing mutual eclipses. So we see them over time, eclipsing one another as they orbit sort of over and over again. So this means they have that going on in that binary star system is orbiting another star. So that, that is pretty cool.

Jordan: Beta Lyrae, Kit. Ye of little faith. And this binary pair, Kit, is not done being cool. It's also a semi detached system, which means to these B type stars, they're orbiting so closely that the originally larger star ended up transferring most of its mass to what was the originally smaller star. So now the secondary star is more massive and has an accretion disk around it.

Kit: Okay, so, yeah, there's a lot going on in this, and this is just one part of the Beta Lyrae system, so. All right, this, this seems worthy of the swerve.

Jordan: We got a lot going on here with Beta Lyrae, so I hope you post on the socials about it and prove that it was worth the pick. Let's take a quick break, and then I'm gonna let you take control and give us your Gold Star of the month. [Music]

Gold Star

Welcome back! This segment is called Gold Star. In this segment, we alternate picking the star or space object in our constellation of the month that captures our mind, our heart, perhaps even our soul. I basically just chose Beta Lyrae as my sneak attack Gold Star because I didn't follow the prompt. But what was your pick this month, Kit?

Kit: So Lyra is small and mighty, not only because Vega is within its bounds, but there's also several other famous and intriguing objects in this constellation. In part, this is because Lyra, like Cygnus, is one of the areas that the Kepler mission was focused on in the night sky. And so there are lots and lots and lots of exoplanets.

Jordan: Exoplanets aplenty one might say.

Kit: So I'm also going to sneak attack two runners up. So the first one, which you might have picked if you'd been in my position, uh, is called Kepler 62. It has five planets, two of which are in the habitable zone. And both are, of those in the habitable zone, are rocky like Earth, although they're a little bit bigger.

Jordan: Pretty compelling. We're always on the lookout for where that Contact signal could be coming from or a second home if this whole Earth thing doesn't work out. So, all right, Kepler 62, that would have been on my list, I think.

Kit: Yep. It's, it's quite far away. It's 1200 light years away. But if, you know, um, who knows?

Jordan: Seems unlikely. It's a lot of light years, but okay what was runner up number two?

Kit: So my second runner up is probably one of the most iconic planetary nebulae that is out there. It is called the Ring nebula, or M 57. Um, it is a common astrophotography target, but we have talked about planetary nebulae before, so I didn't want to give the Gold Star to this, but it is a very, very famous, well known, uh, Messier object, and it is indeed beautiful.

Jordan: It'd be a great choice for Gold Star, but it's a little bit obvious. Where did you eventually decide to go?

Kit: So I was sort of inspired by this planetary nebula, the Ring nebula, which I will post pictures of because we have a new picture from the James Webb Space Telescope, and it is very cool, but I was inspired by it because eventually our solar system will become a planetary, uh, nebula. So I chose another astronomical phenomenon that will one day be the fate of our galaxy. And this astronomical object is called NGC 6745.

Jordan: Tell me more. How are we going to wind up?

Kit: NGC 6745 is an irregular galaxy that's located 206 million light years away. And it is the result of an ongoing merger slash collision of three different galaxies. And the result

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Kit: is this absolutely breathtaking image of what was probably originally a large spiral galaxy like our Milky Way that looks torn and tattered, um, but holding on and sprinkled with, sort of, bright stars that are the result of the collision and smaller galaxies, sort of, stellar matter coming together and all of these kinds of things. So, uh, I've sent you a picture so you can get a look at this beautiful object.

Jordan: We can see some form of a spiral galaxy that we know, but it, it is, as you said, tattered. And that's how it would look like in the macro cosmic sense. But my first impressions were that you had just shown me some really great latte foam art. [laughter] But on the macro cosmic level, it also does have this beautiful, distorted spiral galaxy, this image that we're so familiar with, with the Milky Way, just sort of being tugged at or starting to be ripped apart in a way that makes something that we're familiar with look entirely new.

Kit: Yeah. So it's beautiful. I will, of course, post pictures on our socials this week. Um, and the reason why it sort of called to me in terms of the planetary nebula is that, as we talked about in our Andromeda episode, eventually the Andromeda Galaxy and the Milky Way Galaxy will collide. And so this picture and this process in NGC 6745 is the result of three galaxies intermingling. So it's not going to be exactly what happens, but definitely pulled some inspiration from that.

Jordan: The collision is coming. If it winds up being anywhere near as beautiful as NGC 6745, then congratulations to the Milkdromeda, or Milk- Omeda or Andromeda Way, which we discussed back in the cosmic background episode of the constellation Andromeda.

Kit: Also, as a bonus, that really tips the scales for this particular choice is that we've

already documented three supernovae in this galaxy, so there's lots going on here, and it's beautiful.

Jordan: Excellent choice, Kit. No notes. [Music]

Outro

That brings us to the end of our exploration of the cosmic background of the constellation Lyra. Next week, we will be retelling and reconstellating the myths of this constellation.

Kit: This has been Kit

Jordan: And Jordan.

Kit: Sisters, lovers of stars and stories.

Jordan: And we'll see you next time

Kit: On Starry Time. [Music]

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