

Now this light echo that we're observing around this star V838 Monocerotis has several very useful scientific applications. One is that the location of each illuminated piece of dust that we see in the light echo is determined exactly in three dimensional space because we know the speed of light and we know how long after the outburst we're observing. So we can determine from just plain geometry and knowing the speed of light exactly where that piece of dust is in the surroundings of the star and that means we can make a fully three dimensional map of the dust shell around that star, if we maintain observations regularly spaced out over time. And this is a really unique opportunity to make a three dimensional map of the nebula surrounding a star. Normally when we photograph these objects we can only determine the two dimensional map and we have to more or less guess what the three dimensional structure is. But in the case of this object there is no ambiguity, we will know the three dimensional structure, so that is very exciting and brand new way to make a map. The second scientific use of this light echo is to determine the distance to this star. Because we know the speed of light we know how long it takes to go out to side and then come to us, that means that that dimension we know what that is in kilometers and then since we know also how big it looks on the sky we can calculate the distance to the star. This again is a unique way to measure the distance to the star that has not been applied very often in astronomy up till now.