Thesis: Galileo's discoveries with the telescope and his scientific arguments against the geocentric worldview were strong enough that scientists should have realized that there was a problem with the Aristotelian/Ptolemaic worldview. However, the number of important, unanswered questions was such that scientists did not yet know that the Copernican/Galilean heliocentric theory was correct.

Main arguments in favor:

1) Telescopic observations of Mars (brightness and especially size during retrograde) make the Copernican explanation of retrograde motion much more plausible than the Ptolemaic model

2) Phases of Venus show that Venus must be moving around the sun. The basic explanation is that in order to be 'full' (the earth sees the side of Venus that the sun is shining on), either 1) the sun must be between Venus and the earth as on the Copernican model or 2) the earth must be between Venus and the sun. However, we know that 2) is ruled out since by observation, we know that Venus is never in the opposite part of the sky as the sun.

Main defense of Ptolemy:

Ptolemaic arguments in favor of geocentrism include that common sense plus Aristotelian physics dictate that the earth can't be moving and if it did, we would notice it. For example, balls dropped from towers would not fall straight down. But with the telescope, Galileo determined that the moon seems to be made of rock and that Jupiter has moons, which effectively show problems with Aristotelian physics. As for the lack of detection of stellar parallax, Galileo argued that the stars could be so far away that the actual parallax is too small to detect.

Where does this leave us:

So there are good reasons for thinking that Ptolemy and Aristotle must be wrong about various things. However, this doesn't mean that Copernicus must be right. For example, the Tychonic system had the sun revolve around the earth, but all of the planets revolving around the sun. This gives us a version of Copernicus's explanation of retrograde motion and explains the phases of Venus, but still has the earth as stationary. In order to tell the difference between the Copernican and Tychonic systems, we would need a dynamical theory explanation motion and there was no acceptable theory at the time (until Newton). So scientists at the time didn't know which theory was correct.