

**NEWS FLASHES Astronomers Astounded by Super-Luminous Objects and Fast Moving Stars Inside the Cores of Galaxies**

**1950s - 1960s:** Astronomers using telescopes sensitive to radio wavelength light discover small intense sources of radio wavelength radiation. The search is on using visual wavelength telescopes, like those at McDonald Observatory, for the exact location of the “loud” radio wavelength objects. Since the radio telescopes can only give a “ballpark” location for the radio-loud objects, astronomers using optical telescopes are having a tough time finding them.

**1960s:** One “radio-loud” object has been identified in an optical telescope, thanks to the Moon. As the Moon eclipsed a radio-loud object called 3C-273, its radio signal faded and stopped. This observation helped astronomers calculate the size and exact location of 3C-273. When astronomers looked for 3C-273 with optical telescopes, they could not make sense of what they saw. Their data indicated that this object was extremely luminous, as luminous as an entire galaxy, but it looked like a star. It is also the most distant object ever observed. Astronomers called this new kind of object a quasi-stellar radio object, or “quasar.” Astronomers and physicists can not yet explain how this quasar radiates so much energy.

**1990s:** Astronomers continue to discover new quasars at ever increasing distances. Astronomers using the Hubble Space Telescope find stars moving at incredible speeds in the core, or center, of some galaxies. These speeds are incredible because astronomers can not come up with a way to explain them with their current understanding of a galactic core made of stars. Something small but extremely massive, several thousand times the mass of our Sun, seems to best explain the observations of these super-fast stars. But astronomers can not see this super-massive central object. And, stars have never been observed with masses this high. What could it be?

**2003:** The Sloan Digital Sky Survey detects thousands of quasars and galaxies as it surveys the sky. As a result of this gigantic survey of the sky, astronomers have data for about 120,000 galaxies. This data supports a theory that many galaxies like our own Milky Way and larger have a super-massive black hole in their core. The Sloan Digital Sky Survey also provided astronomers spectrograms of these galaxies, which showed that the central black holes are getting bigger, and making the cores of these galaxies brighter. Sometimes, the core grows brighter than the whole galaxy.

**2004:** Dr. Karl Gebhardt, an astronomer at the University of Texas at Austin, launched an effort to collect information about galaxies with possible black holes in their cores into one database. This database will help other astronomers compare these galaxies and find relationships between them. Astronomers may submit their own black hole candidates to Gebhardt and his team to be evaluated and possibly included in this growing database of black hole candidates.