

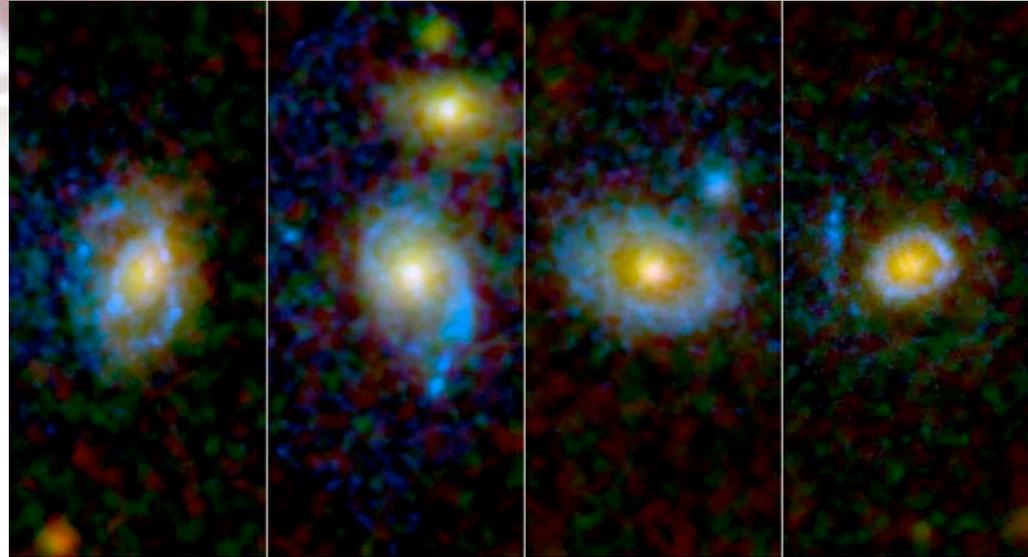
# **JPL SCIENCE HIGHLIGHT: Science Mission Directorate (SMD)**

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## **JPL Science Highlight: Planetary Program Support**

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## Giant Ultraviolet Rings Found in Resurrected Galaxies

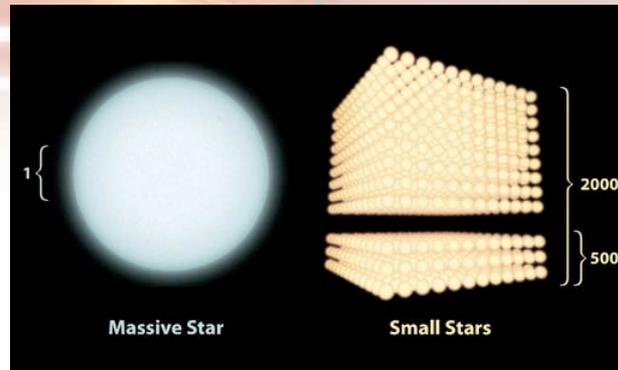


On August 11, 2010, astronomers using JPL's Galaxy Evolution Explorer (GALEX) and the Hubble Space Telescope (HST) announced the discovery of huge ultraviolet light-emitting rings surrounding elliptical galaxies. Observations picked out 30 elliptical and lens-shaped "early-type" galaxies with puzzlingly strong ultraviolet emissions but no signs of visible star formation. Early-type galaxies, so the scientists' thinking goes, have already made their stars and now lack the cold gas necessary to build new ones.

This discovery challenges astronomers' understanding that elliptical galaxies only contain old stars.

Conventional wisdom among astronomers is that elliptical galaxies no longer form new stars because they have no interstellar gas and dust that is needed to form new stars. The stars in elliptical galaxies are about 10 billion years old. As stars run out of hydrogen fuel, they evolve into red giants. The most massive and luminous stars exhaust their fuel most rapidly, so the brightest stars in elliptical galaxies have evolved into their red giant stage. Therefore, elliptical galaxies appear red.

# Giant Ultraviolet Rings Found in Resurrected Galaxies (Cont'd)



## Implications:

Astronomers expect these galaxies to be very faint in ultraviolet light because they lack the hot young stars and hot interstellar gas that glows in the ultraviolet. NASA's GALEX mission proved astronomers wrong. GALEX found 30 elliptical galaxies that were unexpectedly bright in ultraviolet light. Because the GALEX satellite does not have the resolution to discern what portion of these galaxies is brightest in the ultraviolet, the team of astronomers then used the Hubble Space Telescope (HST), with its better resolving power, to make ultraviolet images of these elliptical galaxies. With the HST images, the astronomers discovered giant rings of ultraviolet light surrounding about three-fourths of these elliptical galaxies.

## Significance to Solar System Exploration:

Ultraviolet light is a signature of very hot objects, which are probably massive hot young stars. Massive stars do not last very long, so these galaxies had to have recently acquired the gas and dust needed to start a new round of star formation, after about 10 billion years of no star formation.

For a human analogy, consider a 90-year-old grandmother, whose children are all starting to get old, suddenly giving birth again. This discovery of ultraviolet rings will challenge astronomers' understanding of galaxy evolution just as surely as a pregnant 90-year-old woman would challenge our understanding of human life spans.