



<b>Iranian Resercher Resident Abroad</b>		◀
First Winner	Rank	◀
Basic Sciences	Category	◀
Dr. Bahram Mobasher	Researcher	◀
Iranian	Nationality	◀
Pennsylvania State University	University	◀
Discovery of a Population of Extremely Massive and Evolved Galaxies in the New Born Universe	Project Title	◀
<b>Abstract</b>		◀

Using data from two of NASA's Greatest Observatories, the Hubble and Spitzer Space Telescopes, and the largest ground-based telescopes, Dr. Bahram Mobasher discovered a spectacular galaxy (JD-2), which could potentially change current galaxy formation theories. This is one of the most distant objects found so far and has a mass 8 times that of our Milky Way Galaxy ( $8 \times 10^{11}$  times the mass of our Sun) and was formed ~ 800 Million years after the Big Bang. Currently, it is believed that most galaxies were built up piece-wise by mergers of smaller sub-units throughout the age of the Universe. However, my discovery of this galaxy shows they may indeed have formed quickly and in their entirety long ago (when the Universe had 5% of its present age), in a significant burst of star formation.

He discovered this galaxy in the Hubble Ultra Deep Field (HUDF) data, which is the deepest optical image of the Universe ever taken by the mankind. Despite this, the JD-2 was not detected in those images, indicating that its optical light is absorbed by traveling billions of light years through intervening hydrogen gas. However, it was detected in Hubble's near-infrared camera and is very bright at longer wavelengths, covered by Spitzer. Spitzer Telescope is sensitive to the light from older, redder stars which make most of the mass in a galaxy and hence, its brightness at these longer wavelengths shows the galaxy is extremely massive. He estimated the distance, age and mass of this galaxy by combining multi-waveband information from Hubble, Spitzer and the largest ground-based telescopes.

Dr. Bahram Mobasher used further Hubble and Spitzer observations and found 11 more such galaxies in a small area of the sky, showing these may indeed constitute a new, previously unknown, population of galaxies. One important implication of this discovery is that this new class of galaxies might be responsible for the re-ionization of the Universe very early-on and may be among the first objects ever formed in our Universe. Given the faintness of these objects at optical wavelengths, we could not observe them with even the largest ground-based telescopes. The only way forward to further understand these objects is to use the next generation of space telescopes, James Webb Space Telescope (JWST), to be launched in 2014. These sources will be among the first targets to be observed with the JWST.

This discovery could change the future direction of research in cosmology and revise theories of galaxy formation. It is widely reported by the press worldwide (NASA/ESA/CNN/BBC). It is very exciting to realize how far the mankind has come since the time of Khwarizmi. The discovery of Dr. Bahram Mobasher is an example of how we see galaxies as they first form and how we find the first generation of galaxies in the Universe

