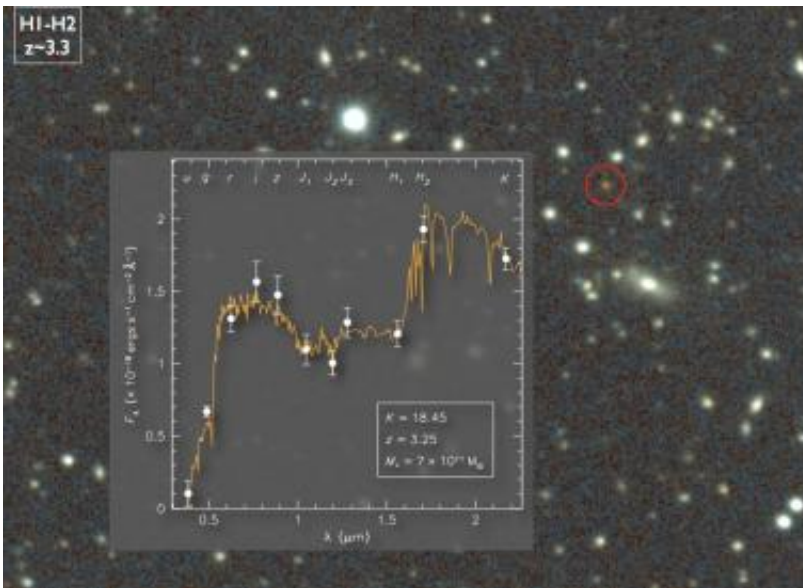


Massive galaxies formed when universe was young

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The massive galaxy circled above was formed when the universe was still young, according to surprising findings from Tufts' Danilo Marchesini.

(PhysOrg.com) -- Some of the universe's most massive galaxies may have formed billions of years earlier than current scientific models predict, according to surprising new research led by Tufts University. The findings appear in the *Astrophysical Journal* published online Nov. 24 in advance of print publication on Dec. 10, 2010.

"We have found a relatively large number of very massive, highly luminous galaxies that existed almost 12 billion years ago when the

universe was still very young, about 1.5 billion years old. These results appear to disagree with the latest predictions from models of [galaxy formation](#) and evolution," said Tufts astrophysicist Danilo Marchesini, lead author on the paper and assistant professor of physics and astronomy at the Tufts School of Arts and Sciences. "Current understanding of the physical processes responsible in forming such massive galaxies has difficulty reproducing these observations."

Collaborating with Marchesini were researchers from Yale University, Carnegie Observatories, Leiden University, Princeton University, the University of Kansas and the University of California-Santa Cruz.

The newly identified galaxies were five to ten times more massive than our own [Milky Way](#). They were among a sample studied at redshift $3 \leq z$

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