Direction des Sciences de la Matière
DAPNIA
Service d'Astrophysique

SEMINAIRE régulier du Service d'Astrophysique

"Star formation in High Redshift Galaxies"

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Yorktown Hts., NY

Jeudi 19 juin 2008

11h00

The Hubble Space Telescope for optical and near-infrared light and the Spitzer Space Telescope for the infrared have opened up a view of star formation in young galaxies that has never been possible before. Because the most distant galaxies are viewed as they were when light left them long ago, we can see the various steps of galaxy formation throughout time. Our work in the last three years has concentrated on the nature of star formation in these galaxies, many of which are peculiar by the standards of our own neighborhood. The dominant peculiarity is the presence of enormous young clusters and star complexes in the disk systems. These complexes are 1000 times more massive than any star forming regions in galaxies today, and yet they appear to form by standard processes, which begin with a localized collapse of disk gas. The galaxy disks are also smaller and thicker than today's spiral galaxies, and many have less than 1/10 the mass of the Milky Way. This combination of small galaxies and big tar complexes makes the youngest disks look very patchy, yet, remarkably, the average positions of these patches, if they were to be smoothed out in each disk, has the same radial density profile as that observed in the more normal spiral galaxies that are also in deep fields. The thicknesses of the star complexes are also about equal to the galaxy thicknesses. Thus it appears that spiral galaxy disks form by the dispersal and dissolution of giant star complexes, which form by gravitational instabilities in thick and turbulent gas layers. Numerical simulations suggest that this process is accompanied by the formation of the bulge and perhaps even black holes in the bulge, through the coalescence of the clumps and their individual black holes that migrate to the center.This process seems to accompany the growth of galaxy disks over cosmic time, indicating that the growth occurs primarily by the accretion of gas for systems that end up as spirals. Clumpy disk star formation also precedes the formation of spirals and ellipticals, going back to the bandshifting limit of the ACS camera on HST, which is z~5. Thus most star formation in the Universe begins in disk systems, and from these, all of today's Hubble types eventually form.

Un café sera servi 15 minutes avant le séminaire

Ce séminaire aura lieu au CEA Saclay – Orme des Merisiers – bâtiment 709, Salle 220.

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