

YCAA Seminar

Tuesday, February 9, 2010

2:00 pm

263 JWG

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The Rise and Fall of Passive Disk Galaxies

The transformation of blue, star-forming disk galaxies into red and dead spheroidals is one of the most important features of galaxy evolution since $z=1-2$. This mass-dependent growth of the "red sequence" has been the subject of many studies, and yet we still lack a convincing picture of the physical processes involved. New insight can be gained, however, by revisiting the assumed link between morphology and star formation. Specifically, I will show how large galaxy surveys are now revealing a significant population of quenched, red-sequence galaxies with surprising disk-like morphologies. These passive disks typically have large bulges but are not confined to dense environments. They represent as much as one-half of all red-sequence galaxies and dominate at lower masses ($\log M_{\text{star}} < 10$). Their evolving abundance compared to other populations suggests that as much as 60% of galaxies transitioning onto the red sequence evolve through a passive disk phase. Simple fading of blue disks is not able to explain their origin, and mergers (possibly inducing AGN feedback) should destroy the disk. I will discuss several other explanations, including environmental effects, internal stabilization, and disk regrowth during gas-rich mergers. Instead of red-sequence growth driven by a single transformation process, this work highlights the fact that galaxy evolution may actually be shaped by several processes proceeding through separate stages.