Semi-Empirical Merger Models - Method:



Example: Galaxy Merger Rates:



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Galaxy Mergers z = 0 Major Gal-Gal Mergers (>1:3) per unit z 0.10 Rate for Halos 🔪 .01 Rate for Galaxies (different $M_{gal}(M_{halo})$ fits) 10 12 8 9 11 log M_{gal} [M_o]

Example: Galaxy Merger Rates:



Must Distinguish What "Mass Ratio" Means!



• Different observable and physical consequences for each!

More Detailed Comparison USING SIMULATIONS TO MAP MERGERS <> OBSERVABLES/BULGES/QUASARS



Hopkins, Somerville, Hernquist+06

Measure Merger 'Timescale', etc.



Compare to Observations:



Consequences for Bulge Formation:



More Detailed Comparison TEST STATISTICS OF QUASAR, RED GALAXY, & MERGER POPULATIONS



IR Luminosity Functions/Distribution of SFRs:



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• Different processes dominate at different luminosities, just like z=0 (but the threshold moves!)

Merger-induced bursts don't dominate SFR density: (but critical for structure of ellipticals)



More Detailed Comparison TEST STATISTICS OF QUASAR, RED GALAXY, & MERGER POPULATIONS

(see also Fontanot et al. 2006, Malbon et al. 2006, Volonteri et al. 2006)



Can Mergers Account for Quasars?

• Predicts the QLF vs. redshift, luminosity, wavelength

