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# GOYA SURVEY: MERGERS UP TO Z = 1 IN B- AND KS-SELECTED SAMPLES

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**In this work we present merger fractions from galaxy samples selected by either Ks-luminosity, or B-band luminosity, from the GOYA photometric survey of the Groth strip using asymmetry indices to identify merging galaxies. The merger fractio n in B-band can be approximated by the function $F_{mg}(z) = 0.006(1+z)^{3.2}$. The merger fraction in Ks-band has a minimum at z = 0.6 and is slightly higher in more massive galaxies.**



The z-evolution of the galaxy merger rate holds the promise of providing an important test for galaxy formation models. However, progress is hampered by large discrepancies between different determinations of the merger fraction, even to moderate redshifts, $z \sim 1$.

In our study we use the Groth Strip catalog from the GOYA team. This catalog covers $\sim 150$ arcmin$^2$ and contains 2492 objects with photometry in six bands, photometric redshifts, spectroscopic redshifts for $\sim 600$ objects and absolute magnitudes with K-correction. The GOYA catalog includes the automatic CAS morphological indexes (Conselice et al. 2003a). We use the fact that in the CAS space the mergers have $A > 0.35$ to select the merger galaxies in our samples.

For our study we selected three samples in absolute magnitude: $M_B < -19$ (495 objects), $M_{K_s} < -22$ (762) and $M_{K_s} < -23$ (610). These samples have a $z_{max} = 1.3$.

To take into account the experimental errors in our data and obtain the merger fraction ($F_{mg}$) that describes our sample, we have developed a maximum likelihood method (ML method) based in the work of García-Dabó (2002). We tested our ML method making Monte Carlo simulations in synthetic catalogs with different experimental errors.

Fitting our data and the data of other studies with $M_B < -19$ to the usual parameterization of the merger fraction we obtain $F_{mg} = (0.0060 \pm 0.0007) \cdot (1+z)^{(3.2 \pm 0.7)}$. This result is in agreement with the values of m $\sim$ 3 predicted by CDM models (Khochfer et al. 2001 and references therein). If we repeat the study not using the ML method we obtain m = 5 $\pm$ 0.6, in contradiction with the models.

In the merger fraction in the Ks-band selected samples we can observe a merger drop at z = 0.6, a drop that has also been measured by Bundy et al. (2004). Bundy's study also includes the Groth Strip: the study of more fields is fundamental to know if this drop is a general characteristic or a cosmic variance effect.

The infrared bands trace the stellar mass of the galaxies more accurately than the optical: the brightest galaxies in Ks band are more massive. We observe that $F_{mg}(M_{K_s} < -23) \lesssim F_{mg}(M_{K_s} < -22)$. Extension of this study to more extreme samples will clarify if massive galaxies continue to grow via mergers at $z < 1$.

## REFERENCES

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