A close view of Galactic Starburst Clusters

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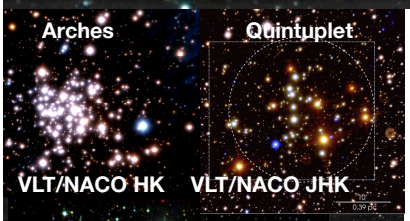
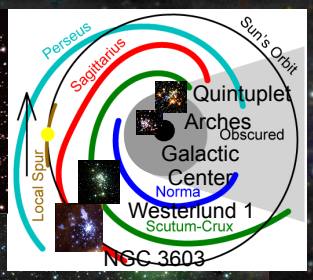
Motivation: Galactic starburst clusters are the
- most extreme mode of present day star formation in the Milky Way
- and are ideal laboratories for studies over the entire stellar mass range (<0.1 to ≥120 M_{Sun})





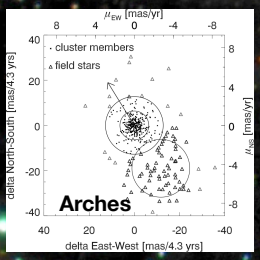
Westerlund 1: mass ≥ 50 000 M_{Sun}
(Brandner et al. 2008, A&A 478, 137)

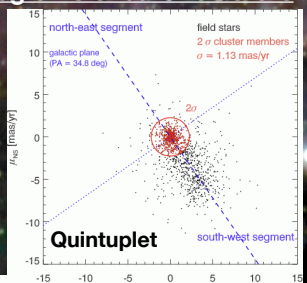
Scope:

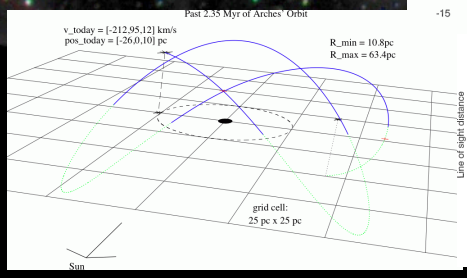
Multi-epoch astrometric, photometric, and spectroscopic study of Galactic starburst clusters using VLT/AO and HST

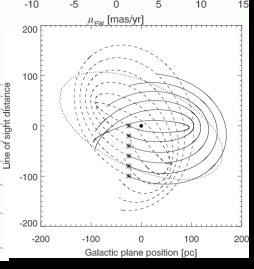
Main Results

Fast motion of Galactic Center region starburst clusters



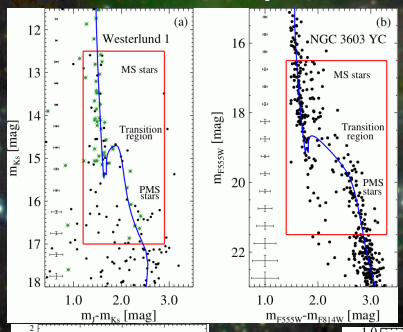




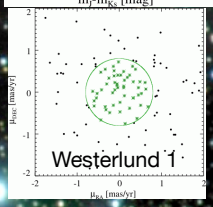


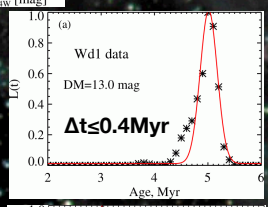
Proper motion studies reveal that both Arches and Quintuplet have transversal motions of ~150 km/s relative to the field, indicating that they are not on simple "circular" orbits around the GC (Stolte et al. 2008, ApJ 675, 1278, Hußmann et al. 2012, A&A 540, 57)

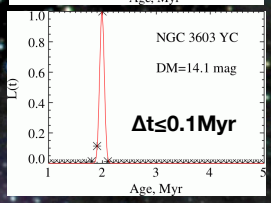
Strict coevality of star formation in spiral arm clusters



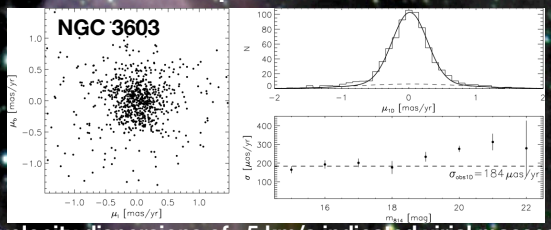
Well defined cluster sequences and small spreads in the global age probability function L(t) indicate that the clusters must have formed almost instantaneously (age spreads ≤0.1 Myr and ≤0.4 Myr, respectively; Kudryavsteva et al. 2012, ApJ 750, L44)





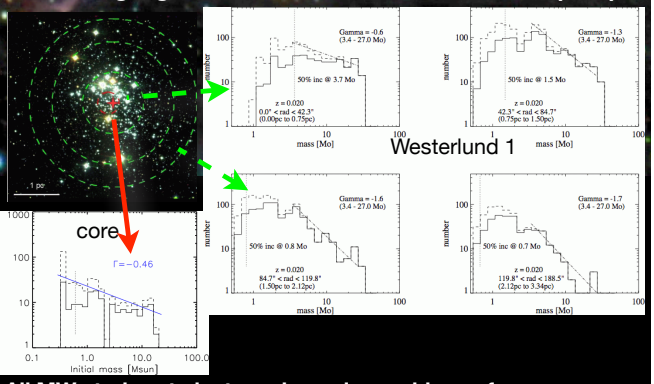


Close agreement between dynamical and photometric mass



Small velocity dispersions of ≤5 km/s indicated virial masses in close agreement with masses derived from stellar population photometry. MW starburst clusters are dynamically stable and will survive for extended periods of time (e.g., Rochau et al. 2010, ApJ 716, L90)

Mass segregation and initial mass function (IMF)



All MW starburst clusters show clear evidence for mass segregation (e.g. Brandner et al. 2008, A&A 478, 137; Gennaro et al. 2011, MNRAS 412, 2469; Kudryavtseva 2012, PhD thesis). Radially averaged the mass functions are in good agreement with a Kroupa-type IMF.

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