


# Intergalactic Stellar Populations (I-RSPs) in the Virgo cluster

Magda Arnaboldi (ESO)

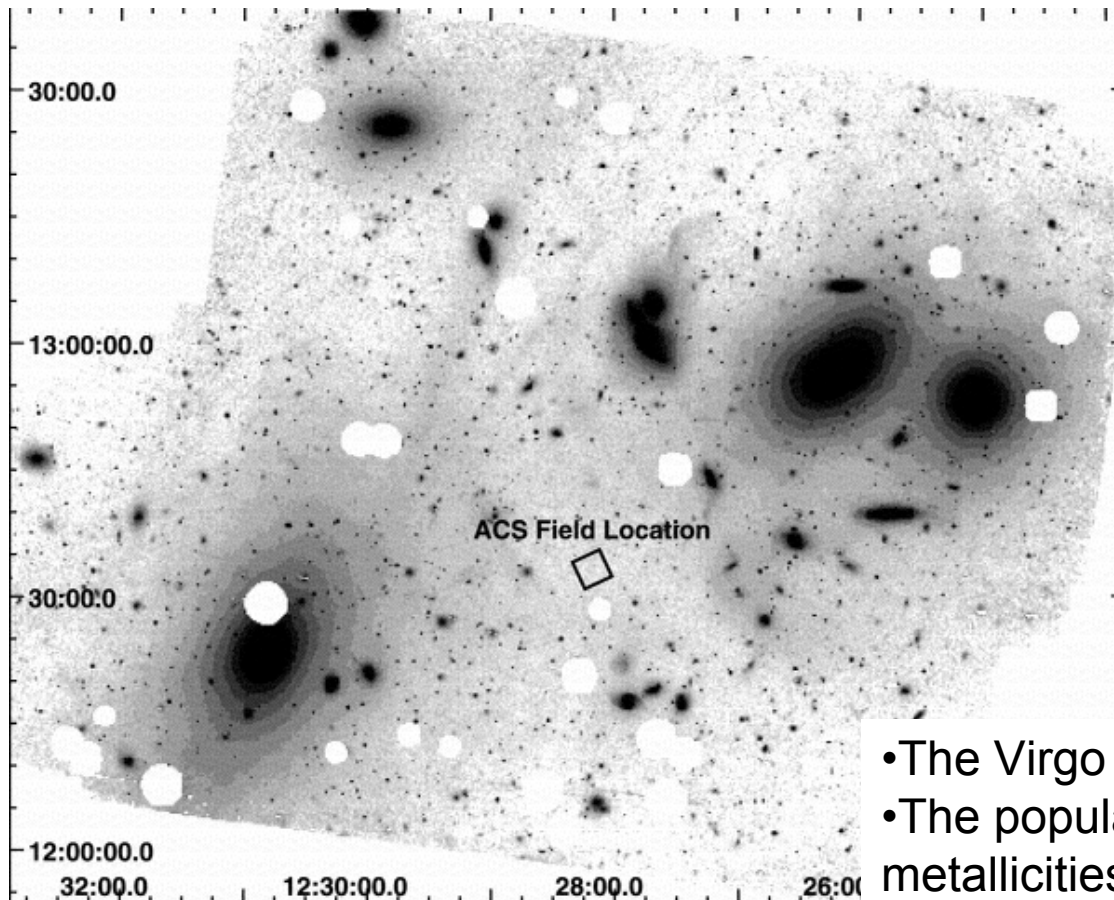
## What we would like to do

- Dynamical times in the outer halos of Es are long – subcomponents are not phase mixed yet – they contain the fossil records of the assembly history of these galaxies.
- The photometry of I-RSPs provide their color magnitude diagrams (CMD).
- The comparison with SSP models gives the age distribution (need TOs), the metallicity distribution (RGB & AGB), and distance of a population.

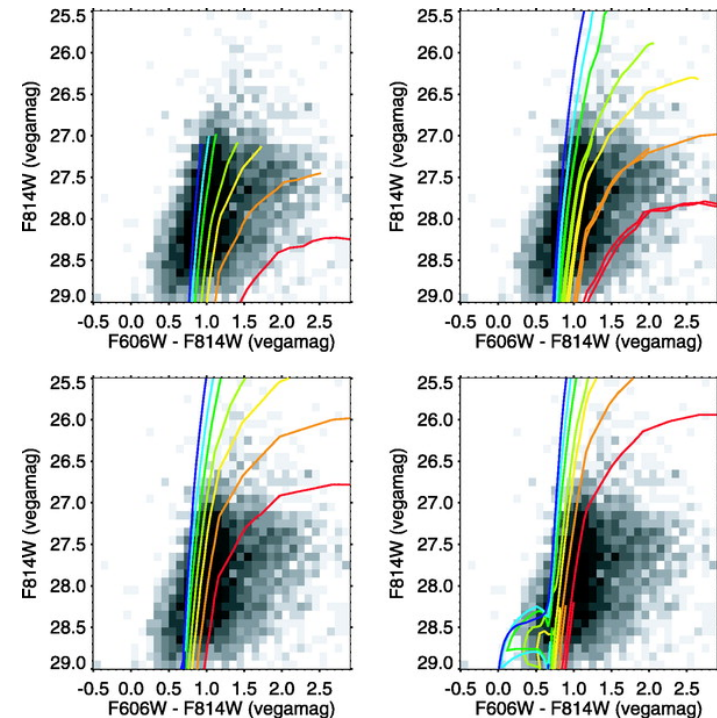
## What we can do now

- High angular resolution – outside LG only from space  HST.
- Problem with crowding: observations confined to very low surface brightness regions: fewer sources!
- Single stars are faint . TRGB@ $M_I = -4.0$  Detections and CMD (I vs V-I) can be measured for stars  $\sim 2$  mag down from the TRBG@4Mpc. At Virgo ( $m_I \geq 26.86$ )  $\sim 0.75$  mag.. Just!

# I-RSPs in Virgo!

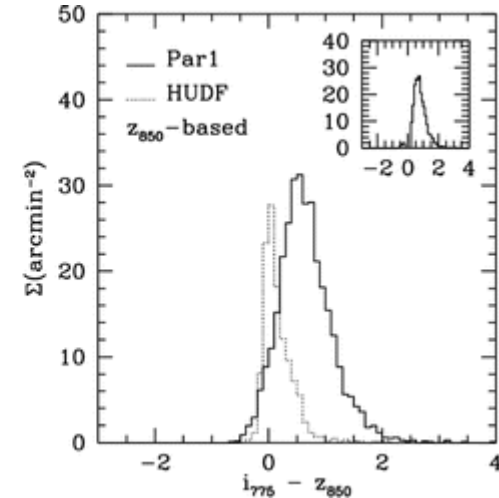
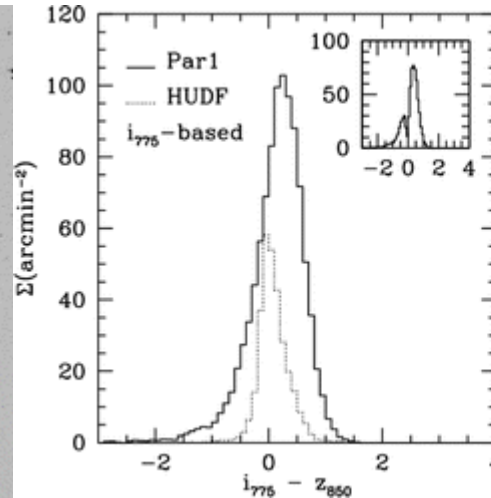
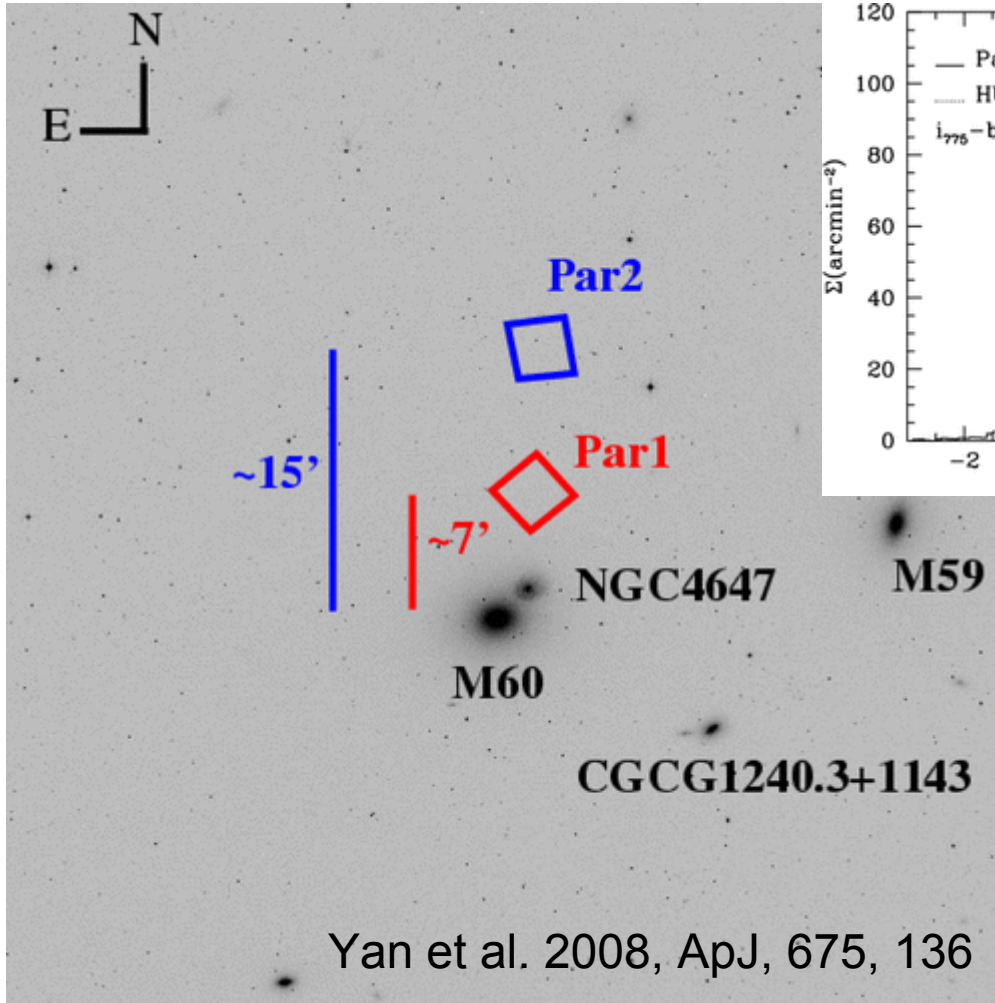


Williams et al. 2007, ApJ, 656, 756



- The Virgo IC stars are mostly old ( $\geq 10$  Gyr)
- The population span a wide range of metallicities ( $-2.3 \leq [M/H] \leq 0.0$ )
- The younger component ( $< 8$  Gyr) is more metal-rich with  $[M/H] > -0.5$ .

# I-RSPs in Virgo – cont.

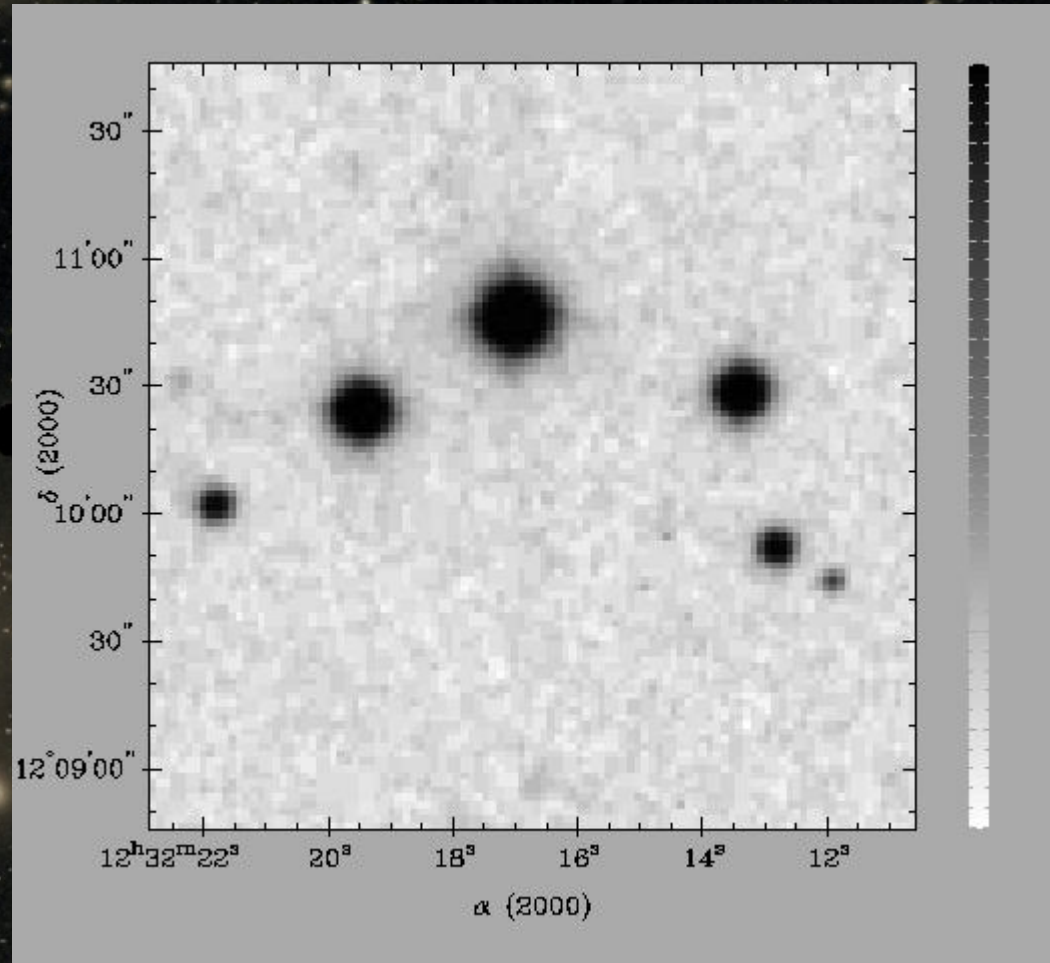
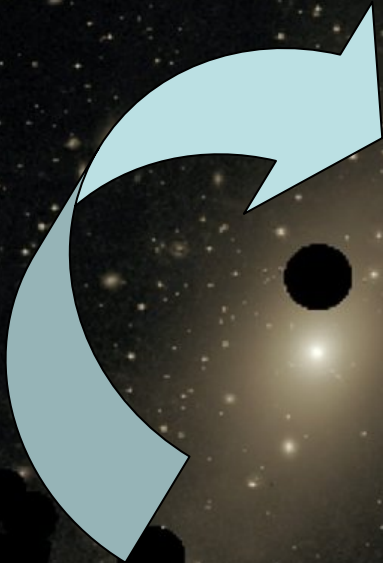


- 2.65 hrs in I - HST & ACS
- 4.28 hrs in z
- 2.13 hrs in J\* - HST & NIC3
- 3.56 hrs in H\*
- Only 2 sub-regions in Par1.

# MAD for I-RSPs in the Virgo cluster

- 2' diameter field in the halo of M87,  $\mu_V \approx 27$  mag/□", with 3 NGS (Jmag = 13). Photometry is not so affected by crowding.

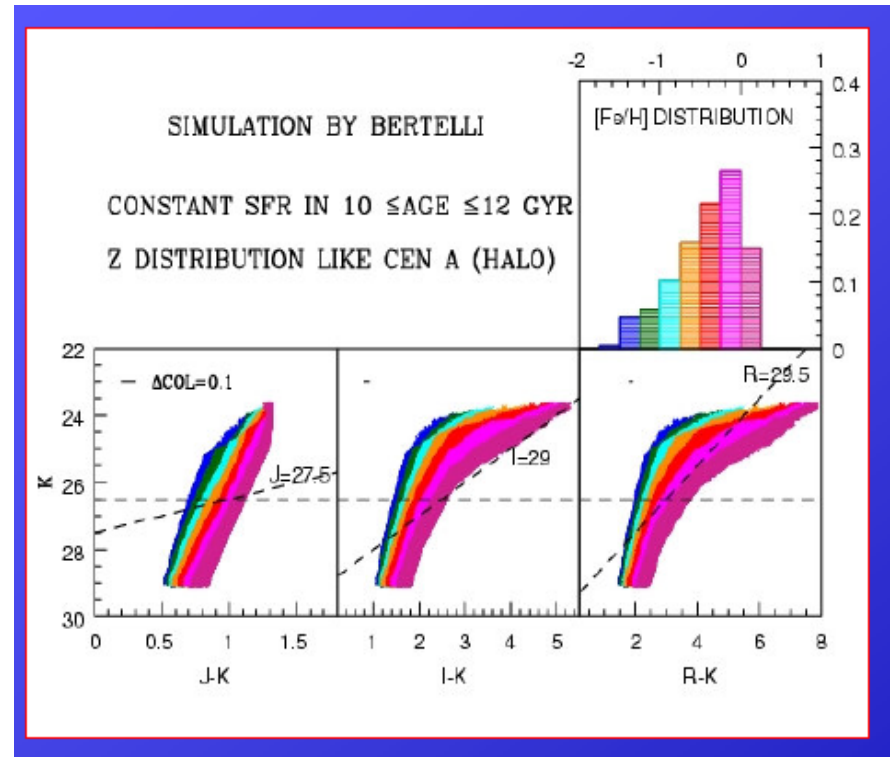
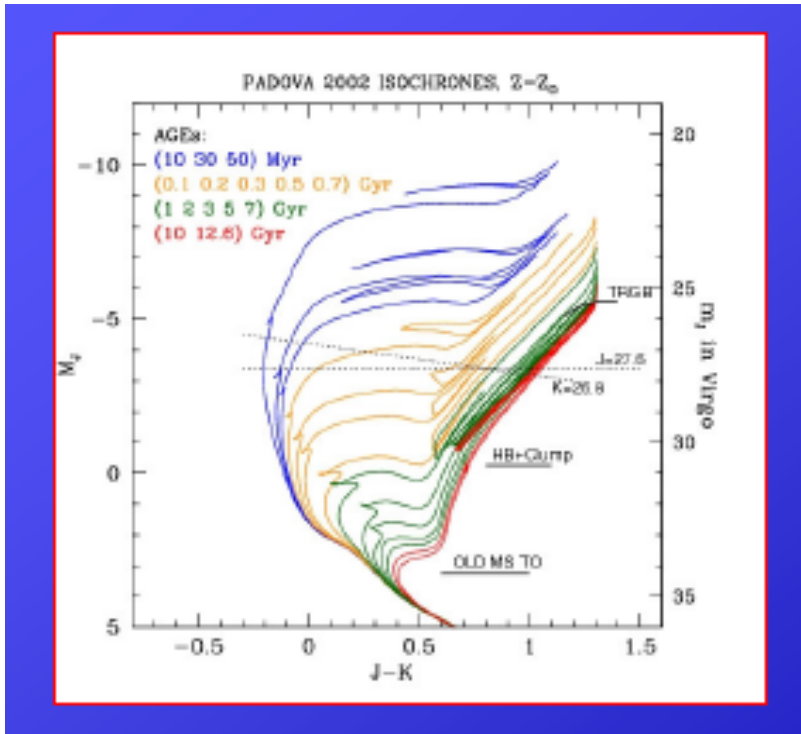
# MAD for I-RSP in the Virgo cluster



# MAD for I-RSPs in the Virgo cluster

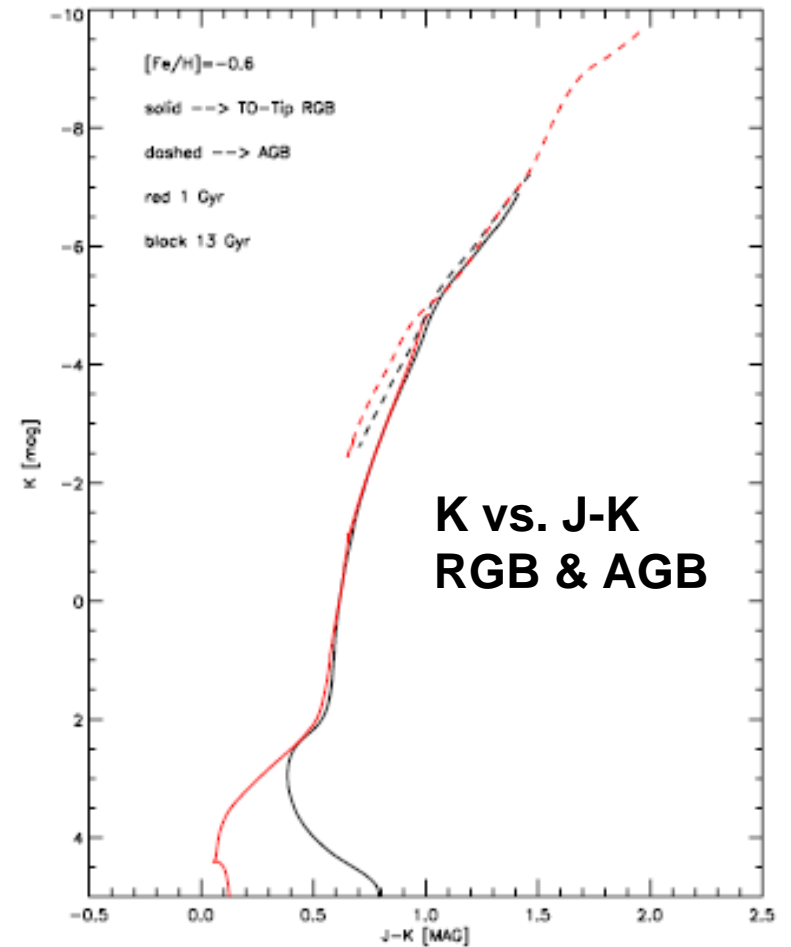
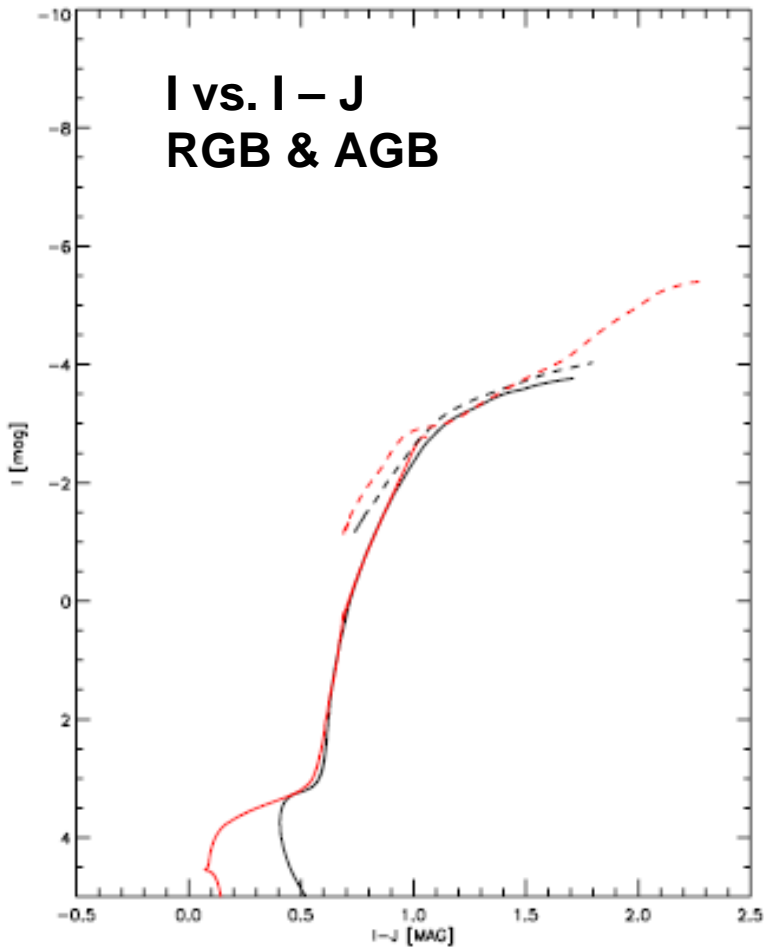
- 2' diameter field in the halo of M87,  $\mu_V \approx 27$  mag/arcmin<sup>2</sup>, with 3 NGS ( $J_{\text{mag}} = 13$ ). Photometry is not so affected by crowding.
- Tip of the I-RGBs at  $m_J = 26.5$ . Stars have NIR  $J-H = 0$ . According to theoretical models AGB are brighter!

# MAD for I-RSPs in the Virgo cluster



From E.Held - DRM workshop 08

# MAD for I-RSPs in the Virgo cluster



G. Bono, priv. comm.



# MAD for I-RSPs in the Virgo cluster

- 2' diameter field in the halo of M87,  $\mu_V \approx 27$  mag/arcmin<sup>2</sup>, with 3 NGS (Jmag = 13). Photometry is not so affected by crowding.
- Tip of the RGBs at  $m_J = 26.5$ . Stars have NIR  $J-H = 0$ .
- Deep image with 50% completeness at  $m_K = 28.2$ , then we expect about 1400 RGBs. On the basis of observations in GCs, we expect about 10% AGBs.

# MAD for I-RSPs in the Virgo cluster

- 2' diameter field in the halo of M87,  $\mu_V \approx 27 \text{ mag}/\square''$ , with 3 NGS ( $J_{\text{mag}} = 13$ ). Photometry is not so affected by crowding.
- Tip of the RGBs at  $m_J = 26.5$ . Stars have NIR  $J-H = 0$ .
- Deep image with 50% completeness at  $m_K = 28.2$ , then we expect about 1400 RGBs & few hundred AGBs.
- Current observations with MAD are complete to  $m_K = 21$  for 700 sec tot integration. To reach the tip of RGBS needs to integrate  $\sim 20$  hrs in J & K ...