

# “Galaxies” with the Virtual Observatory

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# AVO science re: nearby galaxies

- We like comparisons with spectral models, SEDs, colours -- this is a new extension of the AVO that will truly add to existing capabilities
- (i) Philippe Prugniel can offer medium to high-resolution (observed) stellar spectral libraries (UV to NIR) to the AVO

- (ii) Also include PÉGASE, (Bruzual & Charlot), Starburst99, GALEV (Göttingen) synthesis models
- (iii) Then make the TGMET and GALEV-SED tools available to the community via the AVO; add clear warnings about their applicability -- SDSS, 2dF?  
**!! You still need to be an astronomer to use the VO!!**

Stellar population histories

Comparison of theoretical spectra with  
observations

# Science cases - I

- Rich galaxy clusters: environmental effects on the member galaxies (“harassment”, ram pressure); UCDs -- what are they? Finding rare populations, parameterising their stellar populations, *follow-up with spectroscopy*
- Merging clusters -- age dating of the latest merger event; effects on the member galaxies; X-rays, SDSS, HI

# Science cases - II

- Resolved (star-by-star) stellar populations of the nearest galaxies: star counts, merging histories, GC disruption
- GPS sources (young AGN) - 6 to 90 cm; spectral slopes; IRAS data to confirm?  
Understanding low-level activity in galaxies

# Rich and merging clusters; environmental effects

- Selection of suitable nearby clusters
- Inventory of the available archival data at any given position on the sky (registries), e.g. 2MASS (DENIS), SDSS, ROSAT, NVSS, FIRST, GALEX pointings, IRAS, HST pointings -- need to define suitable wavelength coverage; SDSS vs 2dF spectra (digitized spectr. Schmidt plates)
- Inventory of available spatial resolutions (depending on science goals)

- Generate on-the-fly SEDs from photometric data, using user-defined vs “standard” apertures (consistent size across data archives; take spatial resolution into account)
- From radio data, assess whether there are AGN-dominated galaxies in the sample
- Derive stellar population parameters, user-defined IMF, SFH, resulting in ages, metallicities, etc.
- Generate the expected high-res spectrum, convolve with actual spectral resolution, (and subtract stellar component from AGN)
- User-provided fitting routines (Prugniel, de Grijs)

# GPS source identification

- Need to use radio data; all radio catalogues in the VizieR database
- Assess whether the radio spectra are consistent with GPS sources -- identification of these sources is new
- Correlate with their properties at other wavelengths; understand the ill-studied physics of these objects

# Star-by-star stellar populations

- Need star count tools; density distributions
- Table filtering tools
- Extend the M31/SMC science case to other Local Group galaxies, star streams in the MW, etc.

# The fundamental questions

- *How do stars form in galaxies?*
- *How are galaxies formed from stars?*

**... or, alternatively ...**

- *When were stars formed?*
- *Where are they now?*