Contribution ID: **234** Type: **Poster**

Assessing the scaling relations of stellar populations in galaxies in the local universe

The evolution of galaxies is driven by a combination of complex mechanisms. Some of the most relevant concern: the assembly
of dark matter structures, gas dynamics, hydrodynamics, and thermodynamics. The interplay of these mechanisms brings to
star formation, and feedback. These processes, in turn, produce systematic variations between different galaxy properties.
The relations that link extensive properties with intensive ones are generally known as scaling relations. Scaling relations are
particularly meaningful because they keep track of the full evolutionary history of a galaxy; very much alike archaeological
records. Theoretical models are commonly calibrated against such relations in the present-day Universe. Therefore, having
a reliable assessment of such scaling relations, is crucial to study galaxy evolution. In this work we characterized two of the
most relevant scaling relations: the mass-age, and the mass-metallicity. More precisely, we revised the results by Gallazzi et
al. (2005) to provide bias-free and volume-complete scaling relations in the Local Universe. To improve with respect to the
previous work we: used a bigger galaxy sample using the Sloan Digital Sky Survey DR7, improved the ingredients for Stellar
Population Synthesis (e.g. stellar spectral libraries, evolutionary tracks, Star Formation History and Chemical Enrichment
History prescriptions), and introduced explicit dust treatment in the modeling. We also considered corrections for the
aperture effects caused by the finite aperture of SDSS optical fibers, and statistical corrections to account for biases arising
from sample and Signal-to-Noise Ratio selections. In our analysis we used a bayesian approach based on a comprehensive
library of Composite Stellar Populations models. We found that the prescription for the Star Formation History (SFH) and
Chemical Enrichment History (CEH) can have a systematic impact on the estimates of light-weighted ages and metallicities.
In particular, by allowing for an increasing phase of the SFH, a clear bimodality in the mass-age relation emerges. Corrections
for the aperture effects result in an enhancement of the age bimodality and a decrease of the mean stellar metallicity. These
well-characterized scaling relations constitute the fundamental local benchmark against which new high-redshift observations
should be confronted.

Primary author: MATTOLINI, Daniele (Trento University/INAF-OAA)