QING LIU

Curriculum Vitae ⋄ updated: Mar 1st 2017

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EDUCATION

University of Science and Technology of China (USTC)   *September 2014 - Present*

Undergraduate, Department of Astronomy, School of Physics

Overall GPA : 88.17/100   Major GPA : 93.75/100   Rank : 3/19

RESEARCH INTERESTS

Galaxy Formation and Evolution   Stellar Populations & Star Formation in Galaxies

Galaxy Physical Properties and Demographics   Galaxy Survey – Integral Field Unit (IFU) Survey

Astrostatistics & Astroinformatics   Black Hole Accretion Disk

Interstellar Medium (ISM) – HII Regions

SKILLS & TECHNIQUES

Computer Languages   Python (>3 yrs), R, IDL, C, Shell, Mathematica

Software & Packages   DS9, IRAF, Numpy, Scipy, Astropy, Pandas, Matplotlib (General);
BC03, FSPS, SMpy (SPS); FAST, STARLIGHT, PPXF (SED-fitting);
SExtractor, AstroImageJ, statmorph (Photometry); PyMC (MCMC);
Scikit-learn/image, AstroML, PyTorch (Machine Learning)

RESEARCH EXPERIENCE

Bachelor-thesis, Zentrum fúr Astronomie der Universität Heidelberg   *Feb 2017 - Present*
Advisor: Prof.Ralf Klessen

· Build machine learning approach (SVM, RF, etc.) to map line ratios calculated from CLOUDY onto physical parameters ($M_{cluster}$, Age, n_{cloud}, etc.) using WARPFIELD-EMP semi-analytic feedback model
· Compute likelihood distributions of key parameters by feeding the trained machine on real data of HII regions in NGC628 from the SITELLE survey to explore degeneracies of models
· Validate the inferred properties of HII regions using data from the LEGUS survey with the purpose of testing & improving the WARPFIELD-EMP model

Summer Research, University of California, Santa Cruz (UCSC)   *July 2017 - Present*
Advisor: Prof.David Koo & Prof.Sandra Faber   Partner: Xin-yi Tong (THU)

· Generate synthetic SED for different star formation history (SFH) models
· Compute model color evolutions and match them with 0.5<z<2.5 observations in CANDELS
· Test SFH models derived from abundance matching and main sequence with SED-fitting
· Fine-tune effects of fluctuations, measurement errors and metallicity on SFH models

Undergraduate Research, USTC   *October 2016 - November 2017*
Advisor: Prof.Xu Kong & Dr.Enci Wang

· Fit continuum & emission lines of SDSS MaNGA IFU datacubes
· Derive resolved quantities (eg. Σ_*, Σ_{SFR}, SFH, D4000) for MaNGA galaxies
· Construct subsamples for galaxies with 'inside-out' and 'outside-in' recent assembly modes
· Explore the connections between patterns of the Sub-Galactic Main Sequence (SGMS) and galaxy properties, assembly modes, feedback effects and evolutionary stages.

Summer Research, National Astronomical Observatory (NAOC)   *August 2016*
Advisor: Prof.You-jun Lu

· Reconstruct synthetic spectra with Binary Black Hole (BBH) double-disk accretion models
· Infer posterior physical properties of BBH in Mrk231 from Keck spectra with MCMC
· Simulating BBH dynamical & frictional timescales in separate coalescence stages

Course Project: Computer Vision   *May 2017*

· Image Deconvolution: Recover faint exoplanent signals from Gemini/HST images based on K-L Transformation and High-pass Filtering

ACADEMIC ACCOMPLISHMENT

1. **Teaching / Reseaching Assistantship**

   - **Research Assistant**   *November 2015 - Present*

     Key Laboratory for Research in Galaxies and Cosmology, USTC

   - **Teaching Assistant**   *Fall 2017*

     AY14204   Galactic Astronomy
         Textbook: Galaxies in the Universe, 2nd edition, S & G   Class size: 40

     02217001   Astronomical Labs
         Software & Data Process (plotting, file i/o, fitting etc.)   Class size: 34

     ∗ Rank **2/696** among all TAs in the 2017 Fall TA evaluation

2. **Publication List**

   (a) Articles published in refereed journals

       i. Enci Wang, Xu Kong, Huiyuan Wang, [3 authors], **Qing Liu**, 2017, ApJ, 844, 144
          Title: The Properties of Massive Star-forming galaxies with Outside-in Assembly Mode
          Link : arxiv.org/abs/1707.00594

   (b) Articles accepted by refereed journals

       i. **Qing Liu**, Enci Wang, Xu Kong, [4 authors], accepted by ApJ, to be published
          Title: Elevation or Suppression? The Resolved Star Formation Main Sequence of Galaxies with Two Different Assembly Modes
          Link : arxiv.org/abs/1803.00319

   (c) Articles submitted to refereed journals

       i. Yulong Gao, Enci Wang, Xu Kong, [3 authors], **Qing Liu**, [4 authors], submitted to ApJ
          Title: What Determines the Local Metallicity of Galaxies: Global Stellar Mass, Local Stellar Mass Surface Density or Sar Formation Rate?

   (d) Articles in process

       i. **Qing Liu**, Xinyi Tong, David Koo, Sandra Faber, Aldo Rodriguez-Puèbla, [5 authors]
          Title: From Classic to Realistic: Connecting Star Formation Histories, Color Evolutions and SED-fitting of 0.5<z<2.5 Galaxies in CANDELS

       ii. **Qing Liu**, Daniel Rahner, Victor Ksoll, Eric Pellegrini, Dimitrios Gouliermis & Ralf Klessen
           Title: Machine Learning on the WARPFIELD-EMP Feedback Model with Validation from Observations of HII Regions in NGC 628

3. **Oral Presentation**

- Title: Connecting SFH, Color Evolutions and SED-fitting of 0.5<z<2.5 Galaxies in CANDELS
  1.5 hours, USTC Colloquium, November 2017

- Title: Properties of Stellar Populations in Star-forming Galaxies Based on SED-fitting
  15 minutes, CANDELS Meeting, August 2017

- Title: Resolved Main Sequence in Local SFGs Following Two Star-Forming Scenarios
  1 hour, UCSC Colloquium, July 2017

- Title: Data Reduction & Calibration: Spectroscopy and Photometry with IRAF/AstroImageJ
  15 minutes, NAOC Time Domain Observational Astrophysics Workshop, July 2016

4. **Conference & Workshop Attended**

- CANDELS Team Meeting   *August 2017*
- Galaxy Formation & Evolution Workshop   *August 2017*
- SDSS-IV MaNGA Team Meeting & MaNGA Data Workshop   *November 2016*
- Annual Conference of Astronomical Society of China   *October 2016*
- NAOC Time Domain Observational Astrophysics Workshop   *July 2016*

AWARDS

NAOC Scholarship, USTC Excellence Scholarship Silver (top 10% in physics), USTC Talent Program