SungWon Kwak

kwakcosmo@gmail.com

https://swkwak.github.io/

[Education]

Ph.D. in Astronomy at **the University of Rome,** joint by Sapienza, Tor Vergata & INAF 2019-2022

Thesis: *The Formation and the Chemodynamical Evolution of the Milky Way and the Galactic Components*

Advisor: Prof.Giuseppe Bono

M.S. in Astronomy at **Seoul National University** 2014-2016

Thesis: *Origin of Non-Axisymmetric Features of dE galaxies in the Virgo Cluster*

Advisor: Prof.Woong-Tae Kim

B.S. in Astronomy at **the University of Washington**, Seattle 2009-2013

The Storm King High School, New York 2007-2009

[Ongoing Projects]

- **Stellar Halo**: Study the density distribution and the chemodynamical properties of old stellar Halo by comparing the observed RR Lyrae variables and the Auriga simulations and suggest a probable formation scenario of the Milky Way.

- **Bulge/Disk**: Study bars, bulges, and disks in the Auriga simulations to understand three different gradients in the radial metallicity profiles of late-type galaxies found in observations.

- **Dark Matter Halo**: Find connection among bulge, stellar halo, and dark matter halo to conjecture the properties of the dark matter halo of the Milky Way.

[Experience]

- Research Assistant at Seoul National University 2019 Summer

Project: *Effects of Cluster-Group Merger on Bar Formation and Star Formation Rate of Infalling Disk Galaxies (Prof.Woong-Tae Kim)*

- Mandatory Military Service at Korea Astronomy and Space Science Institute 2016-2019

- Internship at CERN (University of Michigan-CERN Research Abroad Program) 2014 Winter

[References]

Prof.Giuseppe Bono, University of Rome Tor Vergata bono@roma2.infn.it

Prof.Federico Marinacci, University of Bologna federico.marinacci2@unibo.it

Dr.Robert Grand, Instituto de Astrofísica de Canarias (IAC), Tenerife grand@mpa-garching.mpg.de

[Publications]

(7) *The Shape of the Galactic Halo up to 150 kpc through RR Lyrae and the Auriga Simulations*

Kwak, SungWon, et al. (submitted to A&A Letter)

(6) *On the Use of Field, RR Lyrae as Galactic Probes. VII. Mixed mode RR Lyrae variables in Fornax and in nearby dwarf galaxies*

Braga, V. F., **et al.** (accepted to MNRAS)

(5) *On the Use of Field RR Lyrae as Galactic Probes. V. Optical and Radial Velocity Curve Templates*

Braga, V. F**., et al.**, APJ, 919, 85B (2021)

(4) *Origin of Non-axisymmetric Features of Virgo Cluster Early-type Dwarf Galaxies – II. Tidal Effects on Disk Features and Stability*

Kwak, SungWon; Kim, Woong-Tae; Rey, Soo-Chang; & Quinn, Thomas R., ApJ, 887, 139K (2019)

(3) *The Geometric Albedo of (4179) Toutatis Estimated from KMTNet DEEP-South Observation*

Bach, Yoonsoo P., et al., JKAS, 52, 71B (2019)

(2) *Effects of Gas on Formation and Evolution of Stellar Bars and Gaseous Nuclear Rings in Disk Galaxies*

Seo, Woo-Young; Kim, Woong-Tae; **Kwak, SungWon**; Hsieh, Pei-Ying; Han, Cheongho; & Hopkins, Phil F., ApJ, 872, 5 (2019)

(1) *Origin of Non-axisymmetric Features of Virgo Cluster Early-type Dwarf Galaxies – I. Bar Formation and Recurrent Buckling*

Kwak, SungWon; Kim, Woong-Tae; Rey, Soo-Chang; & Kim, Suk, ApJ, 839, 24 (2017)

[Scholarships]

- PhD Fellowship for the AASS joint program in Rome 2019-2022
- Kim In Ha Scholarship 2015-2016
- Brain Korea 21 Scholarship 2014-2016
- Erasmus Mundus Scholarship for 2 years, Category A (offered) 2014-2016
- Scholarship for the CERN internship by Richard Lounsbery Foundation 2014

[Undergraduate Research Experience]

- SPH Simulation: the Stability of Protoplanetary Disks (Prof.Thomas Quinn) 2013
- Finding Superimposed High Redshift Spectra Using AstroML (Dr.Jake Vanderplas) 2013
- ATLAS-CERN Inner Tracker Upgrade (Prof.Shih-Chieh Hsu) 2013
- Radio Astronomy: the Galactic Plane (Prof.Woodruff Sullivan) 2012-2013

[Programming Experience]

Numerical Simulations and/or Output Analysis: *ChaNGa, GIZMO, Gadget2,* and *AREPO*

Data Analysis: *Python (Pynbody)*

Astronomical Image Analysis using *IRAF*

Engineering Modeling using *Solidworks*