

SungWon Kwak

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Curriculum Vitae

Research Interests:

Computational Astrophysics, Galaxy Formation and Evolution, Galactic Substructure,
Dwarf Galaxy, Cluster Environment, Dark Matter Halo, Cosmology

[Education]

- **Ph.D. candidate** in Astronomy, Astrophysics and Space Science 2019–2022
at the University of Rome, “La Sapienza” and “Tor Vergata” (expected)
- **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 2009–2014
B.S. in Physics at the University of Washington, Seattle
- The Storm King High School in Cornwall on Hudson, New York 2007–2009

[Ongoing Research]

- Origin of Blue Cores and Kinematically Decoupled Cores in Early-type Dwarf Galaxies

[Publications]

(5) Effects of Cluster-Group Merger on Bar Formation and Star Formation Rate of Infalling Disk Galaxies

Kwak, SungWon; Kim, Woong-Tae; Quinn, Thomas R. (in prep.)

(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. (submitted to ApJ)

(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)

[Programming and Simulations]

- Data Analysis and Visualization using Python mainly and C++
- Smoothed Particle Hydrodynamics Simulations using ChaNGa(Charm++) & Gadget(MPI)
- Magnetohydrodynamics Simulations (MHD) using a grid-based code
- Astronomical Image Analysis using IRAF
- Engineering Modeling using Solidworks

[Undergraduate Research]

- Internship at CERN, Geneva 2014
(University of Michigan–CERN Research Abroad Program)
- SPH Simulation: Stability of Protoplanetary Disk 2013
with Prof. Thomas Quinn at UW–Seattle
- Finding Superimposed High Redshift Spectra Using AstroML 2013
with Dr. Jake Vanderplas at UW–Seattle

- ATLAS-CERN Inner Tracker Upgrade
with Prof. Shih-Chieh Hsu at UW-Seattle 2013
- Stellar Populations of Giant Low Surface Brightness Galaxies
with Dr. Peter Yoachim at UW-Seattle 2013
- Radio Astronomy
with Prof. Woodruff Sullivan at UW-Seattle
1) Hydrogen Distribution of the Galactic Plane 2012-2013
2) Estimation of the Moon's Temperature
3) Continuum Map of the Galactic Plane

[Talks / Posters] (all in English)

Poster: Formation of Bar and Spirals of Infalling Dwarf Galaxies in Clusters

Kwak, SungWon; Kim, Woong-Tae; Rey, Soo-Chang; & Quinn, Thomas

The 8th KIAS Workshop on Cosmology and Structure Formation in Nov. 2018 (Seoul, Korea)

E-Poster: Are Disk Dwarf Galaxies Unstable to Formation of Bars and Spirals?

Kwak, SungWon; Kim, Woong-Tae

334th IAU Meeting 2018 (Vienna, Austria)

Talk: Bar Formation and Recurrent Buckling Instability (50min)

Kwak, SungWon

KASI Galaxy Group Seminar in June 2017 (Daejeon, Korea)

Korean Numerical Astrophysics Meeting in Sept. 2017 (Daejeon, Korea)

Talk: Non-axisymmetric Features of Dwarf Elliptical Galaxies (15min)

Kwak, SungWon; Kim, Woong-Tae; Rey, Soo-Chang; & Kim, Suk

id:GC-24, Korean Astronomical Society Meeting 2016 (Busan, Korea)

Talk: Origin of Non-axisymmetric Features of dEs in the Virgo Cluster (15min)

Kwak, SungWon; Kim, Woong-Tae; Rey, Soo-Chang; & Kim, Suk

id:202.08, 228th AAS Meeting 2016 (San Diego, CA, USA)

Poster: Bulge Kinematics of Giant Low Surface Brightness Galaxies

Schmitz, D.; Yoachim, Peter; Loebman, S.; Debattista, V. P.; **Kwak, S.**

id:453.06, 223th AAS Meeting 2014 (Washington, D.C., USA)

Poster: IFU Observations of Giant Low Surface Brightness Galaxies

Yoachim, Peter; Schmitz, D.; Loebman, S.; Debattista, V. P.; **Kwak, S.**

id:453.05, 223th AAS Meeting 2014 (Washington, D.C., USA)

[Observations]

- Student Radio Telescope (2.3 meter dish)
- A-Wing Observatory at the UW-Seattle (16")
- Manastash Ridge Observatory in Washington (30")

[Scholarships]

- Kim In-Ha Scholarship 2015-2016
- Brain Korea 21 Scholarship 2014-2016
- Erasmus Mundus Scholarship in Germany, Category A (offered) 2014-2016
- Richard Lounsbery Foundation (CERN) 2014

[Miscellaneous]

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