

# SungWon Kwak

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Curriculum Vitae

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## Research Interests:

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

## [Education]

- **Ph.D.** in Astronomy and Astrophysics 2019–2022  
at the University of Rome, ‘La Sapienza’ and ‘Tor Vergata’ (expected)
- Mandatory Military Service at Korea Astronomy and Space Science Institute 2016–2019
- **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

## [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 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 2013  
with Prof.Shih-Chieh Hsu at UW–Seattle

- 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 8<sup>th</sup> KIAS Workshop on Cosmology and Structure Formation in Nov. 2018(Seoul, Korea)

E-Poster: Are Disky 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)

#### [Scholarships]

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

#### [Observations]

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