### Name: Tom Broadhurst Email: tom.j.broadhurst@gmail.com

PhD: 1990, University of Durham, UK.

### **Employment:**

1991 - Research Fellowship, Royal Observatory Edinburgh, Scotland

1993 - Research Associate, Johns Hopkins University Baltimore USA

1995 - Adjunct Professor, UC Berkeley USA 1996 - Assistant Professor, UC Berkeley USA

1999 - Faculty, ESO Garching, Germany.

2002 - Senior Research Faculty, Tel Aviv University, Israel

2010-present "Ikerbasque" Professorship, University of the Basque Country.

2015-present "Visiting Research Professor" Physics Dept, Hong Kong University.

#### **Awards and Distinctions:**

Long Term Space Astrophysics Award NASA 1995-2000 (US800K)

NASA Exceptional Achievement Medal for Hubble Telescope Advanced Camera.

2004 Japan Society for the Promotion of Science Visiting Fellowship Japan

2004 Distinction of Visiting Fellow, ASIAA, Taiwan

2008-2020 Awarded Visiting Research Professor Scheme, Hong Kong/HKU

2015-2017 Awarded Visiting Research Professor Scheme, Hong Kong/HKU

2018-2020 Distinction of Honorary Professor, Hong Kong/HKU

2020-2021 Collaborative Research Fund, RGC/Hong Kong (PI: Lim).

#### Major Satellite and Large Telescope Projects:

1995 Co-I Advanced Camera on NASA Hubble Space Telescope.

2000-2005 Co-I K20 Redshift Survey, Florence, Italy.

2005-2012 Core team, Alhambra Survey, Granada, Spain.

2009-present Lensing Manager, JPAS telescope survey, Teruel, Spain.

2010-present Core team, NASA Hubble ``Treasury" Cluster Lensing and SN program (CLASH).

2014-present Octocam-Team approved proposal for new GEMINI telescope instrument.

2011-present Co-I of ESA/NASA EUCLID satellite mission.

2014-present NASA Hubble Frontier Field STScI/HKU team.

2015-present JWST (NASA) Co-I of Medium-Deep Survey/PI Windhorst.

**Observational Experience (facilities where I have won time and used directly):** 

Hubble, Keck I&II, VLT, Subaru, VLA, KPNO, AAT, UKSTU, INT, WHT, UKIRT,

Parkes, NTT, WFI, Calar Alto, Lick.

# **Teaching Experience:**

Undergraduate and Graduate courses (4 yrs Berkeley, 5 yrs Tel Aviv, 3yrs UPV/Bilbao) : Introductory Cosmology(Berk), High Energy Astrophysics(Berk), Graduate Cosmology(Berk), Introduction to Probability Theory and Statistics (UPV) Telescope Lab instructor(TAU)

Introduction to Probability Theory and Statistics (UPV), Telescope Lab instructor(TAU)

Graduate Lensing Seminar Series(Berk &TAU).

Lecturer, CSIC Summer School, Laredo, Spain June 1996

Lecturer, Italian Physical Society Summer School, Varenna, Italy July 2008

Leading Lecturer, Winter School for Cosmology, ASIAA, Taipei Feb. 2014

Summer Student Cosmology Lectures and Summer Program Supervision/HKU, 2014,2015,2016

# **Research Interests:**

Dark Matter, Galaxy Clusters, Large Scale Structure, Gravitational Lensing,

Gravitational Redshifts, High-z galaxies, Galaxy Evolution, Cosmological

Parameters, GPU accelerated computing, Gravitational Waves.

# Major Projects I have helped Initiate:

NASA bid for building the Hubble Advanced Camera (2003-present): and Co-I of the Guaranteed Time Observations Team (PI: Ford,H.) (I drafted the main science case component - for cluster strong lensing.)

Hubble "Treasury Program" CLASH (Cluster Lensing and Supernova with Hubble) – largest allocation of Hubble Time awarded (2012-present) which I initiated, and wrote the main science case for cluster lensing.

Hubble Flashlights Program: 2020 - category of Large HST programs (192 orbits) PI:Kelly,P. (responsible for recognising this new phenomenon).

#### **Five Selected Publication <2016:**

Broadhurst T.J., Ellis R.S. and Glazebrook K.,1992 Nature, v355, "Faint Galaxies: Evolution and Cosmological Curvature"

Broadhurst T.J., Taylor A.N., Peacock J.A., 1995 Ap. J. 438,49"Mapping Cluster Mass Dis- tribution via Gravitational Lensing of Background Galaxies"

Broadhurst T.J., Lehar J., 1995 Ap. J. Lett. 450, L41 "A Gravitational Lens Solution for IRAS F10214+4724"

Broadhurst, Tom; Bentez, Narciso; Coe, Dan; Sharon, Keren; Zekser, Kerry; White, Rick; Ford, Holland; Bouwens, Rychard; ApJ 2005, 621,53 "A strong lensing analysis of A1689 from deep Advanced Camera observations"

Schive, H., Chiueh, T., & Broadhurst, T., 2014, Nature Physics, 10, 496 "Cosmic structure as the quantum interference of a coherent dark wave."

#### **Five Selected Publication >2016:**

Schive, H.-Y., Chiueh, T., Broadhurst, T., & Huang, K.-W. 2016, ApJ, 818, 89 "Contrasting Galaxy Formation from Quantum Wave Dark Matter, {\$\psi\$}DM, with {\$\Lambda\$}CDM, using Planck and Hubble Data."

Diego, J.~M., Broadhurst, T., Molnar, S.~M., Lam, D., & Lim, J. 2015, MNRAS 447, 3130 "Freeform lensing implications for the collision of dark matter and gas in the frontier fields cluster MACS J0416.1-2403."

Jimeno, P., Broadhurst, T., Lazkoz, R., et al.\ 2017, MNRAS, 466, 2658 "Precise clustering and density evolution of redMaPPer galaxy clusters versus MXXL simulation."

Broadhurst, T. de Martino, I., Luu, H., Smoot, G. F., Tye, S. -H, "Ghostly Galaxies as Solitons of Bose-Einstein Dark Matter.", 2020, **PRD** 101,3012

Schive, Hsi-Yu, Chiueh, Tzihong & Broadhurst, T. "Soliton Random Walk and the Cluster-Stripping Problem in Ultralight Dark Matter", 2020 **PRL** .124,20

**In total,** 282 refereed papers published peer-reviewed, Google Scholar: 28900 citations, h-index: 93