MARK HOLLANDS

Contact details

Email: m.hollands@sheffield.ac.uk
Address: Department of Physics and Astronomy, The University of Sheffield, Sheffield, United Kingdom, S3 7RH
Webpage: https://mahollands.github.io/

Education

Postgraduate: PhD, The University of Warwick (Oct 2013–Mar 2018)
Thesis title: The properties of cool DZ white dwarfs
Supervisor: Boris Gänsicke

Undergraduate: BSc Physics (MPhys), The University of Warwick (2009–2013)

Employment history

Oct 2021–present The University of Sheffield
Supervisor: Stuart Littlefair

Oct 2018–Sep 2021 The University of Warwick
Supervisor: Pier-Emmanuel Tremblay

Oct 2017–Sep 2018 The University of Warwick
Supervisor: Boris Gänsicke

Research Interests

- White dwarf planetary systems
- Model atmospheres
- Magnetic white dwarfs
- White dwarfs in binaries
- The initial-final mass relation
- Statistics of the local white dwarf population
- Surviving remnants of SNIax

Select publications

- **Spectral analysis of cool white dwarfs accreting from planetary systems: from the ultraviolet to the optical**
  M. A. Hollands, P.-E. Tremblay, B. T. Gänsicke, D. Koester, *MNRAS* 511, 71 (2022)
- **Alkali metals in white dwarf atmospheres as tracers of ancient planetary crusts**
  M. A. Hollands, P.-E. Tremblay, B. T. Gänsicke, D. Koester, N. P. Gentile-Fusillo *Nature Astronomy* 5, 451 (2021)
- **An ultra-massive white dwarf with a mixed hydrogen–carbon atmosphere as a likely merger remnant**
  M. A. Hollands, P.-E. Tremblay, B. T. Gänsicke, M. E. Camisassa, D. Koester, A. Aungwerojwit, P. Chote, A. H. Córsico, V. S. Dhillon, N. P. Gentile-Fusillo, M.J. Hoskin, P. Izquierdo, T. R. Marsh, D. Steeghs, *Nature Astronomy* 4, 663 (2020)
- **The Gaia 20 pc white dwarf sample**
  M. A. Hollands, P.-E. Tremblay, B.T. Gänsicke, N. P. Gentile Fusillo, S. Toonen, *MNRAS* 480, 3942 (2018)
- **Cool DZ white dwarfs II: compositions and evolution of old remnant planetary systems**
  M. A. Hollands, B.T. Gänsicke, D. Koester, *MNRAS* 477, 93 (2018)
- **Cool DZ white dwarfs I: Identification and spectral analysis**
  M. A. Hollands, D. Koester, V. Alekseev, E. L. Herbert, B.T. Gänsicke, *MNRAS* 467, 4970 (2017)
- **The incidence of magnetic fields in cool DZ white dwarfs**
  M. A. Hollands, B.T. Gänsicke, D. Koester, *MNRAS* 450, 681 (2015)

- **A planetesimal orbiting within the debris disc around a white dwarf star**
  C. J. Manser, B. T. Gänsicke, S. Eggl, **M. Hollands**, P. Izquierdo, D. Koester, J. D. Landstreet, W. Lyra, T. R. Marsh, F. Meru, A. J. Mustill, P. Rodríguez-Gil, O. Toloza, D. Veras, D. J. Wilson, M. R. Burleigh, M. B. Davies, J. Farihi, N. Gentile Fusillo, D. de Martino, S. G. Parsons, A. Quirrenbach, R. Raddi, S. Reffert, M. Del Santo, M. R. Schreiber, R. Silvotti, S. Toonen, E. Villaver, M. Wyatt, S. Xu, S. Portegies Zwart, *Science* (2019)
- **Interpretation and diversity of exoplanetary material orbiting white dwarfs**
  A. Swan, J. Farihi, D. Koester, **M. Hollands**, S. Parsons, P. W. Cauley, S. Redfield, B. T. Gänsicke, *MNRAS* (2019)
- **Partly burnt runaway stellar remnants from peculiar thermonuclear supernovae**
  R. Raddi, **M. A. Hollands**, D. Koester, J. J. Hermes, B. T. Gänsicke, U. Heber, K. J. Shen, D. M. Townsley, A. F. Pala, J. S. Reding, O. F. Toloza, I. Pelisoli, S. Geier, N. P. Gentile-Fusillo, U. Munari, J. Stader, *MNRAS* 489, 1489 (2019)
- **Core crystallization and pile-up in the cooling sequence of evolving white dwarfs**
  P.-E. Tremblay, G. Fontaine, N. P. Gentile-Fusillo, B. H. Dunlap, B. T. Gänsicke, **M. A. Hollands**, J. J. Hermes, T. R. Marsh, E. Cukanovaite, T. Cunningham, *Nature* 565, 202 (2019)
- **Anatomy of the hyper-runaway star LP 40−365 with Gaia**
  R. Raddi, **M. A. Hollands**, B. T. Gänsicke, D. M. Townsley, J. J. Hermes, N. P. Gentile Fusillo, D. Koester, *MNRAS* 479, 96 (2018)
- **Further Insight on the Hypervelocity White Dwarf, LP 40−365 (GD 492): A Nearby Emissary from a Single-degenerate Type Ia Supernova**
  R. Raddi, **M. A. Hollands**, D. Koester, B. T. Gänsicke, N. P. Gentile Fusillo, J. J. Hermes, D. M. Townsley, *ApJ* 858, 3 (2018)
- **The binarity of the local white dwarf population**
  S. Toonen, **M. A. Hollands**, B. T. Gänsicke, T. Boekholt, *A&A* 602, 16 (2017)

Talks

- **Modelling magnetic white dwarf spectra with the help of theoretical chemistry** – online seminar (Mainz, January 2022)
- **Modelling the spectra of highly magnetised DZ white dwarfs** – online workshop (Warwick, July 2021)
- **Alkali metals in white dwarf atmospheres as tracers of ancient planetary crusts** – online seminar (Sheffield, March 2021)
- **The detection of lithium in cool white dwarf atmospheres** – presented at White Dwarfs from Physics to Astrophysics (online KITP meeting, March 2021)
- **Alkali metals in white dwarf atmospheres as tracers of ancient planetary crusts** – online seminar (UFRGS, March 2021)
- **A white dwarf of spectral type DAQ** – presented at IAU symposium 357, *White dwarfs as probes of fundamental physics and tracers of planetary stellar & galactic evolution* (Hilo, October 2019)
- **Spectroscopy of partially burnt runaway stars** – presented at *Stars on the run II* (Potsdam, August 2019)
- **A white dwarf with an unusual composition as the potential product of a binary merger** – presented at *The beginnings and ends of double white dwarfs* (Copenhagen, July 2019)
- **Partially burnt remnants of SNIax in the Milky Way** – seminar (Southampton, February 2019)
- **Partially burnt remnants of SNIax in the Milky Way** – presented at *The supernova - supernova remnant connection* (RAS meeting, London, January 2019)
- **Revisiting the white dwarf local sample in the era of Gaia** – presented at the 21st *European white dwarf workship* (Austin, July 2018)

- **Remnant planetary systems around the oldest white dwarfs** – seminar (Caltech, September 2017)
- **Chemistry and evolution of the oldest white dwarf planetary systems** – presented at IAU symposium 332, *Astrochemistry VII* (Puerto Varas, March 2017)
- **Chemistry and evolution of the oldest white dwarf planetary systems** – presented at *Planets beyond the main sequence II* (Technion, March 2017)
- **Chemistry and evolution of the oldest white dwarf planetary systems** – seminar (IoA Cambridge, November 2016)
- **A large sample of cool, strongly-polluted DZ white dwarfs** – presented at the 20th *European white dwarf workshop* (Warwick, July 2016)
- **Metals as tracers of magnetism in old white dwarfs** – presented at the *Stellar end products* meeting (ESO Garching, July 2015)
- **Planetary systems as tracers of magnetism in old white dwarfs** – presented at the workshop *Mysteries of the Sun's magnetic field III: Understanding stellar activity* (Warwick, June 2015)
- **Ancient planetary systems around white dwarfs** – presented at the 19th *European white dwarf workshop* (Montreal, August 2014)

Awards

- University of Warwick Postdoc Prize (2020)
- Winton Prize (£1000) for best PhD thesis in astrophysics (Warwick, 2018)
- 500€ IAU travel grant for IAU symposium 332 (2017)
- First place in the Concepts of Habitability competition (Organised by the Centre for Exoplanets and Habitability, Warwick, 2016)
- Excellence in the MPhys project (2013)

Successful observing proposals

- **GTC** OSIRIS (2019), *A runaway white dwarf with a peculiar composition*
- **WHT** ISIS (2018), *A high-mass white dwarf with a mixed H/He/C atmosphere*
- **GTC** OSIRIS (2016), *Gaseous emission at an ancient magnetic white dwarf*
- **Gemini** GMOS (2015), *A strongly magnetised, metal-polluted white dwarf*
- ***HST*** (2015), *The dawn of rocky planet formation*
- **GTC** OSIRIS (2015), *The peculiar magnetic fields of metal-enriched white dwarfs*
- **VLT** FORS2 (2014), *The peculiar magnetic fields of metal-enriched white dwarfs*
- **WHT** ISIS (2014), *The dawn of rocky planet formation*
- **VLT** XSHOOTER (2014), *The dawn of rocky planet formation*

Technical skills and experience

Reviewing

I have peer-reviewed 6 papers from January 2019 to present

Observing

- Mercator Telescope (photometry, 7 nights April 2019)
- Issac Newton Telescope (photometry, 5 nights March 2018)
- William Herschel Telescope (spectroscopy, 2 nights Dec 2014)
- Issac Newton Telescope (photometry, 7 nights Sep 2014)
- William Herschel Telescope (spectroscopy, 3 nights Dec 2013)

Summer schools attended

- Atomic processes and spectral modelling in astrophysics (STFC), Queens University Belfast, (Sep 2015)
- Introductory summer school in astronomy (STFC), Queen Mary, (Sep 2013)

Data techniques

- Spectral reduction with STARLINK packages (PAMELA/MOLLY)
- Bayesian statistics and MCMC parameter estimation

Computing/Programming

- Python
- Fortran
- Bash/Csh scripting
- C
- LaTeX
- SQL

Github: https://github.com/mahollands

Teaching

- Lecturing experience — (Jan 2018)
- Mathematics for Physicists — Seminar teaching (Oct 2014–May 2016)
- First year electronics workshop — Laboratory demonstrator (Apr 2014–May 2014)
- Mathematics for Physicists — Remedial classes (Oct 2013–Nov 2013)

Other experience

- Advised for upcoming documentary episode on white dwarfs with PioneerTV (Apr–Jun 2020)
- Chaired conference session at *Stars on the run II* (Potsdam, August 2019)
- LOC member for the 20th European White Dwarf Workshop (July 2016)
- IMPACT student led conference: Lead SOC and LOC (Warwick Feb 2015); SOC member (Birmingham Oct 2014; Nottingham Oct 2015)
- Physics postgraduate Student-Staff Liaison Committee: Chair (Oct 2015–Oct 2016); Secretary (Oct 2014–Oct 2015)