UK / Ireland Astrophysics Transients Meeting 2026

University of Bath

September 2026

Contents

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All sessions will take place in the **Chancellor's Building Room 2.6**

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10:20-10:40	*TITAN DR1: 8378 Spectroscopic SNe Ia in the Nearby Universe* Jack Tweddle, University of Oxford
10:40-11:00	*Multi-dimensional non-LTE radiative transfer for a double detonation Type Ia explosion model in the photospheric phase* Fionntán Callan, Queen's University Belfast
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session 2 - SNe and TRANSIENTS, OTHER

13:30-13:50	*The Effect of Circumstellar Dust on the Mass Estimates of Type II-P Progenitors* Timothy Hurton, University of Lancashire
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14:10-14:30	*Disappearing Stars: The Hot, Blue Progenitors of Black-Hole Formation* Avishai Gilkis, University of Cambridge
14:30-14:50	*Bridging gaps between fast radio burst signals and their host galaxies* Marcin Glowacki, University of Edinburgh
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2 Schedule Tuesday September 8

All sessions will take place in the **Chancellor's Building Room 2.6**

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10:20-10:40	*Measurements of the geometric properties of GRBs and their implications on the luminosity—decay correlation* Samuel Shilling, Lancaster University
10:40-11:00	*The Oates Relation: testing a structured jet origin* Cairns Turnbull, Liverpool John Moores University
11:00-11:20	*Revisiting Gamma-Ray Burst Classification with Data-Driven Approaches* Dimple, University of Birmingham
11:20-11:40	*Why are most GRBs not emitting in HE Gamma-rays?* Mayurakshi Mukherjee, SISSA
11:40-12:00	*Righting the Radio Light Curve of the BOAT (GRB 221009A)* Helena-Margaret Grabham, Liverpool John Moores University
12:00-13:30	LUNCH

session 2 - TDEs and TRANSIENTS, OTHER

13:30-13:50	*Unmasking r-process Signatures in Hyper-accreting Black Hole Outflows* Conor Omand, Liverpool John Moores University
13:50-14:10	*Dragon Slaying: Removing active galactic nuclei from tidal disruption event samples* Peter Clark, University of Southampton
14:10-14:30	*EP260302a: a new and extreme relativistic tidal disruption event* Rob Eyles-Ferris, University of Leicester
14:30-14:50	*Revisiting Double Tidal Disruption Events as an Alternative Channel for Extreme Nuclear Transients* William Stone, Liverpool John Moores University
14:50-15:20	COFFEE BREAK

session 3 - TDEs & TRANSIENTS, OTHER

15:20-15:40	*ANTEATER: First Results for the Discovery of Ambiguous Nuclear Transients with LSST and 4MOST* Matthew Quilt, University of Southampton
15:40-16:00	*Analysis of LFBOTs AT2026dbl and AT2026nik* Zoë McGrath, Liverpool John Moores University
16:00-16:20	*Andromeda's Disappearing Star: M31-2014-DS1* Lauren Eastman, University of Oxford
16:20-16:40	*Searches for fast optical counterparts to gravitational-wave events with GOTO* Kendall Ackley, University of Warwick
16:40	CLOSING REMARKS

3 Presentation Abstracts

SN 2024abvb: a Type Ibn/Icn supernova with evidence of helium and an extreme offset from its host galaxy

Callum Aster (Cardiff University)

We present spectroscopic and photometric observations of SN 2024abvb, a peculiar transitional Type Ibn/Icn supernova located at a remarkably large projected distance from its host galaxy (21.5 kpc). Its photometric and spectroscopic evolution set it apart from comparison Type Ibn and Type Icn events, with a higher peak r-band luminosity and lower blackbody temperatures. Early spectra show a blue continuum with narrow P-Cygni profiles, with no high ionised elements and dominated by C $ii\lambda5890$ in emission. While medium-resolution spectroscopy reveals weak He i $\lambda5876$ features that support the Ibn/Icn classification. We assess several progenitor scenarios and find that an ultra-stripped supernova in a binary system provides the most consistent explanation, accounting for the large host offset, low circumstellar material mass, rapid photometric evolution, and low nickel production. These results establish SN 2024abvb as a distinctive Type Ibn/Icn event and underscore the diversity of progenitor channels among interacting supernovae.

TITAN DR1: 8378 Spectroscopic SNe Ia in the Nearby Universe

Jack Tweddle (University of Oxford)

Type Ia supernovae underpin measurements of cosmic expansion, yet modern cosmological samples remain starved of well-characterised events in the local Universe - precisely where the Hubble diagram is anchored and where a DESI-hinted evolving dark energy signal is strongest. I present TITAN DR1, the Type Ia Supernova Trove from ATLAS in the Nearby Universe: 8,378 spectroscopically confirmed SNe Ia at z¡0.15, the largest such sample assembled, including 4,500 cosmology-ready events - an order-of-magnitude increase at low redshift with a tight 0.153 mag scatter. TITAN ships with a bespoke host-galaxy catalogue, providing aperture-matched FUV–MIR photometry and SED-derived masses, star-formation rates, dust, and ages for over 7,000 hosts. Exploiting this, we reconstruct the SN Ia progenitor-age distribution, finding a bimodal population (mean 3.5 Gyr) and a cosmological age bias consistent with zero beyond the mass step. TITAN positions itself as the premier low-redshift anchor for the LSST era and beyond.

Multi-dimensional non-LTE radiative transfer for a double detonation Type Ia explosion model in the photospheric phase

Fionntán Callan (Queen's University Belfast)

Type Ia supernovae are the luminous explosive endpoints of low-mass stars, a source of heavy elements and significantly impact galactic chemical evolution. Despite decades of study, the evolutionary channels and explosion mechanisms that produce these events remain unclear. Type Ia explosion simulations predict inherently asymmetric ejecta structures, while radiative transfer simulations show significant departures from local thermodynamic equilibrium (LTE) as early as a few days after explosion. Radiative transfer simulations which account for both multi-dimensionality and non-LTE effects are therefore key to linking the underlying explosion models to observations. In this talk I will present results from a 2D full non-LTE radiative transfer simulation of a "double detonation" explosion model in the photospheric phase. I will discuss how simultaneously treating multi-dimensionality and non-LTE effects impacts the predicted light curves and spectra, and how this influences the conclusions drawn when comparing with observed Type Ia supernovae.

A Photometric Approach to Type Ia Supernova Science

Nikolaos Shiamtanis (University of Southampton)

We report the spectral evolution of WOHG64 over the past 20years using MIKE, MagE, X-Shooter and UVES data. Previous studies suggest that the star had transitioned into a yellow hypergiant (YHG), primarily due to the disappearance of TiO bands. However, our recent findings show that the TiO bands have reappeared and it is consistent with an RSG classification. We find composite spectral features showing forbidden emission lines of [O I] and [Ca II], which are signatures of hotter stars, supporting the growing consensus that WOHG64 is a binary system. We argue that the ejection of a significant fraction of the outer layers, potentially driven by a violent interaction with a companion, is required to explain this transition. I will discuss the implications of these results in the context of pre-supernova evolution and how they may provide insights into events like SN2023ixf, which exhibited extreme mass loss prior to explosion.

Spending Spectra Wisely: Adaptive Cadence Optimisation for Gravitationally Lensed Supernovae in the Rubin Era

Andrés Ponte Pérez (University of Birmingham)

The Vera C. Rubin Observatory will discover gravitationally lensed supernovae in growing numbers. Well-timed follow-up spectroscopy of lensed supernovae is crucial to probe the astrophysical processes responsible for their spectral evolution, and to extract spectroscopic arrival time differences for measurements of cosmological parameters. Gravitational lensing offers a distinct advantage: the earlier-arriving image A previews its later-arriving counterpart B, allowing for frameworks that can react to the unpredictable changes often seen as supernovae evolve. To maximise the population of well sampled lensed supernovae in the large survey era, we introduce a framework combining machine-learning spectral predictors and a reinforcement-learning adaptive cadence strategy. This optimises the scientific output of each lensed supernovae, and can be engineered to target different science cases: from spectroscopic time delays, to recovering Si II velocity evolution in Type Ia supernovae. In this talk we introduce this framework, results, caveats, and its implications for Rubin-era low-latency follow-up.

High resolution spectroscopy of the Type IIn SN2024xuo

Jasvinderjit Khaulsay (Cardiff University)

Core collapse supernovae, which mark the death of massive stars, are among the brightest transients in the Universe. With the advent of evolving telescope technology and high cadence all-sky surveys, the number of supernovae detections have rapidly increased. The growing population has unveiled the true diversity of these transients, even within subtypes. Among them, recent reports of precursor events have called into question our understanding of stellar evolution in the years leading up to a supernova. One such case is the nearby (z 0.0047) SN2024xuo. It was first discovered in late 2024, where its spectra resembled a Luminous Red Nova, before finally exploding as a Type IIn supernova in early 2025. In this talk, I will present high-resolution spectroscopic observations of SN2024xuo taken with the ESO's X-SHOOTER and UVES spectrographs, with a focus on the progenitor scenario of this transient and the implications for interacting supernovae as a whole.

The Effect of Circumstellar Dust on the Mass Estimates of Type II-P Progenitors

Timothy Hurton (University of Lancashire)

Whilst historic archives of nearby galaxies have been pivotal in identifying progenitors of core-collapse supernovae, images are often limited to optical wavelengths, where circumstellar material (CSM) can lead to systematic underestimation of progenitor initial mass. I will present revised progenitor initial mass estimates of Type II-P SNe using post-explosion light-curve modelling following Morozova et al. (2017, 2018) whilst characterising CSM and associated mass loss. Synthetic light curves, created by exploding KEPLER hydrodynamic models using the SuperNova Explosion Code (SNEC), are compared to observations. Early-time light curves are sensitive to shock interaction with nearby CSM, whilst the plateau phase is used to determine the progenitor's characteristics. Characterising the CSM and its impact on photometric measurements will enable improved estimates of progenitor initial mass derived from optical-only imaging. This will help address the Red Supergiant Problem and provide further insight into mass loss processes during the final stages of massive stellar evolution.

Detecting submm transients (and dodging satellites)

Mike Peel (Imperial College London)

Detecting and characterising submm transients is becoming increasingly feasible with large sky surveys by Cosmic Microwave Background telescopes with tens of thousands of detectors. Observations by the Atacama Cosmology Telescope and South Pole Telescope have already detected transients, while Simons Observatory and CCAT are expected to find many more. These include Gamma-Ray Bursts, Tidal Disruption Events, flaring stars, and other sources where submm observations provide valuable insight into their evolution and origins.

I will describe ongoing efforts to detect transients with SO's Large Aperture Telescope, which is currently surveying the sky from Atacama, Chile, and discuss the potential of future facilities such as AtLAST and PRIMA to discover and follow up submm and infrared transients. I will also highlight the growing challenge posed by thermal emission from low Earth orbit satellites for submm transient detection and future high-sensitivity observations, along with their impacts on optical and radio transient astronomy.

Disappearing Stars: The Hot, Blue Progenitors of Black-Hole Formation

Avishai Gilkis (University of Cambridge)

The formation of stellar-mass black holes may proceed through direct collapse without producing a luminous supernova, giving rise to the hypothesised transient of a disappearing star. Existing searches have largely targeted red supergiants, yet detailed stellar-evolution models predict that most direct-collapse progenitors are instead hot, blue stars, including Wolf–Rayet stars and blue supergiants. I will present theoretical predictions for the observable properties of these progenitors and show that searches relying primarily on red optical bands may systematically miss the dominant population. These results motivate a shift in observational strategy towards ultraviolet and blue wavelengths, with implications for current and future time-domain surveys. I will also discuss how binary interactions and uncertain stellar physics influence the predicted population of disappearing stars and the prospects for identifying black-hole formation without a supernova.

Bridging gaps between fast radio burst signals and their host galaxies

Marcin Glowacki (University of Edinburgh)

Impulsive radio signals such as fast radio bursts (FRBs) are imprinted with the signatures of multi-path propagation through ionised media in the form of frequency-dependent temporal broadening of the pulse profile, commonly referred to as scattering. The dominant source of scattering for most FRBs is expected to be within their host galaxies, an assumption which can be tested by examining potential correlations between the scattering properties of the FRBs and global properties of their hosts. Using several tens of localised FRBs from the Commensal Real-time ASKAP Fast Transients (CRAFT) survey conducted with the Australian Square Kilometre Array Pathfinder (ASKAP) telescope, I present the results of correlation tests for newly measured scattering timescales from the CRAFT survey with their host galaxy global properties. We find a strong positive correlation for the scattering time of the FRB with the stellar surface density or compactness, and also the stellar mass-weighted age and the gas-phase metallicity, potentially attributed to cooler and clumpier metal-rich gas in the interstellar medium increasing FRB scattering times. Compact host galaxies may have more ionised content which scatters the FRB further. Compact galaxies were also found to correlate with gas-phase metallicity in our sample, while HII regions along the line-of-sight are also a potential contributing factor. A strong correlation is also seen for the FRB absolute rotation measure (RM) and the inclination of the host galaxy (higher RMs found for edge-on galaxies). Further high-time resolution FRB detections, coupled with localisation and detailed follow-up on their host galaxies, are necessary to corroborate these initial findings and shed further light into the FRB mechanism.

Science review talk

Nial Tanvir (University of Leicester)

TBD

Using gamma-ray bursts to probe the faint, distant galaxy population

Anne Inkenhaag (University of Bath)

Gamma-ray bursts (GRBs) are the most energetic explosions in the universe, often outshining their host galaxies. They have been discovered out to z 9, revealing their host galaxies, which can go undetected in galaxy surveys due to their faintness. We can therefore use GRBs to probe the faintest, most distant galaxies in the universe, and use their imprint on the GRB afterglow to measure properties such as metallicity. Due to the connection between GRBs and massive stars, these measurements are used to expand the star forming galaxy population measured in emission to lower masses and metallicities.

However, in this process, two assumptions are made that are highly uncertain: GRB host galaxies follow the same fundamental relations as general star forming galaxies and metallicities measured using GRB afterglows and metallicities measured from integrated galaxy spectra can be used interchangeably. I will discuss research being done investigating the validity of both assumptions.

Investigating the Effect of Spatial Resolution on Derived Physical Conditions of Transient Environments

Berk Topcu (University of Bath)

Although we have a good understanding of how massive stars evolve, we still lack robust constraints on how progenitor properties affect the transient events we observe. Studying the environmental properties near a transient event is a powerful method for inferring the characteristics of progenitor stars. While this approach works well for high resolution observations (< 100 pc), beyond z $>\sim 0.1$ resolution drops to kpc scales. This drop in resolution may lead to inaccurate conclusions due to contamination effects from neighbouring environments. It is thus crucial to quantify how measurements obtained at lower spatial resolution deviate from the true local environmental values. In this study, we use IFU observations of z < 0.01 star-forming galaxies from the MAD survey to measure gas-phase metallicities and HαEWs of HII regions at pc scale resolution. We then degrade the spatial resolution to simulate observations at increasingly higher redshifts and repeat the measurements at each step.

Waiting in the wings: extended emission GRBs from time propagation

Issie Worssam (University of Birmingham)

Long GRBs are traditionally thought to originate from collapsing stars and short GRBs from binary neutron star (BNS) mergers. However, the discoveries of kilonovae coincident with GRBs 211211A and 230307A provide conclusive evidence that some long GRBs can in fact originate from BNS mergers. These long merger GRBs can in part be classified by the existence of an extended plateau of emission after the initial prompt spike in their lightcurves, termed extended emission (EE), the source of which is still debated. We present a shell model that utilises high latitude emission and relativistic frame propagation effects to produce EE-like lightcurves. Our results show that when accounting for these effects, long mergers can be reproduced within the limit of the merger engine's short lifetime, without the need for additional sources of energy injection. I will compare to representative EE bursts and show how our model can reproduce features of EE lightcurves.

Measurements of the geometric properties of GRBs and their implications on the luminosity—decay correlation

Samuel Shilling (Lancaster University)

We have compiled an updated sample of 427 gamma-ray burst (GRB) X-ray afterglows, with measured redshifts, observed by the Swift/XRT. Firstly, we analyse our sample for the luminosity—decay correlation. The correlation has previously been observed in long GRB afterglows across multiple wavebands and quantitatively shows that more luminous afterglows tend to have higher average rates of decay. The physical cause may be due to geometric effects from a range of viewing angles, or some mechanism that regulates the rate of energy release from the central engine. Secondly, we model each afterglow with three different jet structures and use the Bayes factors to determine the best-fit model and the corresponding geometric properties for each GRB. I will present the methods and results of the correlation analyses and the afterglow modelling, and explore the physical origin of the luminosity—decay correlation using the geometric properties measured for our sample.

The Oates Relation: testing a structured jet origin

Cairns Turnbull (Liverpool John Moores University)

Empirical correlations have been identified in many aspects of GRB phenomena, e.g. Ghirlanda, Amati, Yonetoku, etc, all of which lack physical explanation. One correlation in particular between the early-time intrinsic brightness and average decay rate of long GRB afterglow light curves, observed across all wavebands from GeV to radio, was first reported by Oates et al. (2012), though it is not predicted by the standard afterglow model. Using synthetic GRB X-ray afterglow simulations, we infer the 1 keV luminosity at 200 seconds and post-200s decay index in order to reproduce this correlation. Simulations with top-hat and Gaussian jet structures suggest the correlation is largely independent of jet structure and mainly driven by viewing angle. This implies the correlation could serve as a cosmographic tool, offering a luminosity constraint independent of jet geometry. I will describe a physical origin for this correlation and discuss the implications for GRB energetics, environments and, perhaps ambitiously, for use as standard candles to provide a new constraint on the Hubble parameter.

Revisiting Gamma-Ray Burst Classification with Data-Driven Approaches

Dimple (University of Birmingham)

Gamma-ray bursts (GRBs) display a remarkable diversity in their light-curve morphologies and spectral properties, arising from the complex physics of relativistic outflows and radiation processes in extreme environments. Conventional classification schemes, such as the long–short or Type I–Type II dichotomy, offer a simplified phenomenological framework but increasingly fail to capture the full breadth of observed behaviour. This work investigates whether the observed diversity of GRBs can be exploited as a diagnostic of the underlying physical mechanisms rather than treated as mere observational scatter. We employ a data-driven approach that integrates unsupervised machine learning techniques with physically motivated modelling of prompt emission pulse structures. In particular, we analyse the clusters identified through dimensionality reduction and clustering algorithms, and examine whether these groupings correspond to distinct physical regimes or instead reflect degeneracies inherent in the observed parameter space. This approach aims to move beyond traditional classification toward a more physically grounded understanding of GRB diversity.

Why are most GRBs not emitting in HE Gamma-rays?

Mayurakshi Mukherjee (SISSA)

Gamma-ray bursts (GRBs) are among the most energetic transient events in the universe, emitting across the electromagnetic spectrum from radio to TeV energies. The Fermi Gamma-ray Space Telescope observes GRBs with two instruments: the Gamma-ray Burst Monitor (GBM; 8 keV–40 MeV) and the Large Area Telescope (LAT; 20 MeV–¿300 GeV). While the GBM detects hundreds of GRBs annually, only a few dozen are also detected by the LAT during their prompt phase. To address if there exists observables to justify undetectability at LAT energies, we analyze one of the largest datasets of long GRBs available from Fermi, comprising 1500 bursts detected by the GBM from 2008 to 2025 that were not detected by the LAT during their prompt emission, despite being in the LAT field of view. Our analysis focusing on spectral properties aims to identify plausible spectral features that distinguish LAT-detected from LAT-undetected bursts.

Righting the Radio Light Curve of the BOAT (GRB 221009A)

Helena-Margaret Grabham (Liverpool John Moores University)

The Brightest-of-All-Time GRB 221009A, aka. the ‘BOAT’ remains the most energetic gamma-ray burst (GRB) ever recorded. As a 1 in 10,000 year event, the BOAT released an isotropic energy of 55 ergs, causing disturbances in the Earth’s ionosphere and puzzling astronomers due to its incredible luminosity and excess radio flux contribution within the long-lasting afterglow emission. Classical afterglow models only predict optical and X-ray radiation and not the more complex radio signature. This triggered deep searches for a supernova association, however, after no evidence was found, the shallow decline from the radio emission remained unsolved. We show how the observed multi-band afterglow can be fully reproduced using a nested tophat model, a combination of two GRB jet models with simple modifications to the micro-physical jet parameters. This provides better knowledge of where energy release occurs inside jets, allowing us to build a quasi-universal model for all GRBs to fit.

Unmasking r-process Signatures in Hyper-accreting Black Hole Outflows

Conor Omand (Liverpool John Moores University)

Hyper-accreting black holes in collapsars and super-collapsars represent some of the most extreme accretion environments in the universe. While neutron star mergers are confirmed sites of r-process nucleosynthesis, galactic abundances suggest that these massive black hole accretion disks may also be prolific r-process element factories. These engines launch massive, stratified outflows consisting of an inner radioactive 56Ni core shrouded by r-process material. However, the light curves of these outflows remain largely unmodelled. We employ an N-shell radiative diffusion model to resolve the stratified layers of the ejecta. Through a survey of synthetic light curves, we define the specific parameter space under which signatures from the innermost regions become observable. I will discuss how our N-shell radiative diffusion model offers a vital tool for indentifying these rare transients, and highlight how high-resolution modelling can peel back the layers of these massive radioactive outflows.

Dragon Slaying: Removing active galactic nuclei from tidal disruption event samples

Peter Clark (University of Southampton)

The contamination of tidal disruption event (TDE) samples by variable active galactic nuclei has been a persistent problem in the compilation of pure TDE samples for population studies. With the number of TDE candidates expected to grow rapidly, it is of growing importance to improve overall sample purity to prevent the introduction of significant biases into our growing understanding of TDEs and their host galaxies. Here I will present a method leveraging the distinct mid-infrared properties of TDE outbursts as observed by WISE that allows for a pure sample of TDEs occurring in galaxies with dense nuclear environments to be isolated from other forms of nuclear activity. I will outline the properties of this sample and how its properties relate to, and differ from, the established population of TDEs and other nuclear transients more generally, and how this work can be expanded using new SPHEREx data.

EP260302a: a new and extreme relativistic tidal disruption event

Rob Eyles-Ferris (University of Leicester)

Relativistic tidal disruption events (rTDEs) are vanishingly rare transients powered by the disruption and accretion of a star by a massive black hole and characterised by long lived jets. EP260302a is only the fifth candidate rTDE in fifteen years. In X-rays, it is the fastest and most luminous rTDE, displays both red and blue optical/NIR components, and it is the most luminous radio transient of any class detected to date. Recent optical imaging has also suggested an offset from the host galaxy, contradicting the assumption that rTDEs occur at the nuclear SMBH. Together, these suggest that EP260302a is an extreme member of a extreme transient class, possibly involving an intermediate mass black hole. I will present our extensive observing campaign and analysis of EP260302a, including the first JWST observations of an rTDE, and look to the future observations that will help understand the properties of this rare transient.

Revisiting Double Tidal Disruption Events as an Alternative Channel for Extreme Nuclear Transients

William Stone (Liverpool John Moores University)

A recently discovered subset of luminous, long-lived, nuclear transients has been attributed to accretion events onto supermassive black holes (SMBHs). These extreme nuclear transients (ENTs) have been interpreted as the tidal disruption of high-mass stars by massive SMBHs. However, the rare nature of this channel means it struggles to reproduce the number of ENT observations thus far. We propose a formation channel which could serve as an alternative explanation for massive star tidal disruption events (TDEs), double TDEs from stellar binaries.

We perform a rigorous parameter space study on the double TDE channel and discuss the conditions for producing either a single or double peaked light curve. Using analytic scalings and physically motivated light curve predictions we also comment on how well we can replicate the observational features of ENTs. We also demonstrate the implications of specific optical/UV emission models for the viability of double TDEs as ENT progenitors.

ANTEATER: First Results for the Discovery of Ambiguous Nuclear Transients with LSST and 4MOST

Matthew Quilt (University of Southampton)

As our surveys grow wider and deeper, we are discovering new classes of transient beyond theoretical predictions. Ambiguous Nuclear Transients (ANTs) represent one such class, intriguing as they include the most energetic optical transients observed. ANTs occur around a galaxy's central SMBH but show smooth light curves lasting years: not conforming to TDEs or AGN.

With the upcoming industrialisation of transient astronomy, it is critical to leverage this tidal wave of data to maximise the detection of new ANTs for the statistical resolution of sub-types and constraining progenitors. Ideally, these ANTs should be detected early in their rise to promptly arrange follow-up spectroscopy campaigns across all phases.

To address these challenges, I present ANTEATER, a machine learning classifier that processes the LSST alert deluge via the Lasair broker to provide candidates for TiDES as well as RISOTTO and ePESSTO+. I will share early ANT results from this exciting new era.

Analysis of LFBOTs AT2026dbl and AT2026nik

Zoë McGrath (Liverpool John Moores University)

Luminous Fast Blue Optical Transients (LFBOTs) are rare transients with unprecedented properties. They evolve fast, are luminous across the EM spectrum, and have spectra showing a featureless, blue continuum characteristic of hot ($\gtrsim$ 15,000 K) blackbody radiation. Shared characteristics suggest a common origin, but this origin is unclear. I will present an analysis of the two most recent LFBOTs, AT2026dbl and AT2026nik. AT2026dbl is very similar to other LFBOTs such as AT2024wpp and AT2018cow, peaking at Mg   -21.3, declining as a power law and is luminous in the optical, X-ray and radio. However, AT2026nik has a shallower decay, shows fainter X-ray luminosities and has not yet been detected in the radio, indicating that it may be an outlier in the LFBOT class. If it is an outlier, it would help to constrain our LFBOT progenitor models and allow us to bridge the gap between LFBOTs and other fast transients.

Andromeda's Disappearing Star: M31-2014-DS1

Lauren Eastman (University of Oxford)

A Salpeter initial mass function predicts that $\sim$30% of core-collapse supernova progenitors have initial masses ¿18M(sun). However, despite over 28 direct progenitor detections and deep limits for others, we see little evidence for this population. Alternative theories propose that massive stars collapse directly into black holes without producing a luminous supernova: a failed supernova. Recent observations of a peculiar event in M31 showed a star that 'disappeared' in the optical and faded significantly in the infrared, with a x10 decrease in bolometric luminosity (De et al. 2026). Could this be a failed supernova? Here we present new Pan-STARRS data filling the time gap in the discovery paper, revealing a 115d transition from its bright state to disappearance. We will compare this to stellar collapse models as a critical test of the failed supernova scenario, and present a Pan-STARRS search for similarly disappearing objects in M31 over a 14-year baseline.

Searches for fast optical counterparts to gravitational-wave events with GOTO

Kendall Ackley (University of Warwick)

The electromagnetic follow-up of gravitational-wave (GW) events remains one of the key observational challenges in transient astronomy. Wide-field optical facilities must respond rapidly to large and evolving localisation regions, search for rapidly fading counterparts, and distinguish between plausible counterparts from the many unrelated optical transients found in the same area.

In this talk, I will discuss GOTO's systematic follow-up of 162 GW alerts during the O4 observing campaign, focusing on our follow-up strategy, coverage performance, candidate identification, and lessons learned from a large-scale and dedicated GW follow-up effort. With regards to candidate identification, I will discuss how Bayesian ranking methods can help identify and prioritise individual transients as possible GW counterparts, even when only minimal information about the transient is available.

Finally, I will outline upcoming plans for community access to GOTO data products and discuss how these resources can support rapid classification coordinated searches for multi-messenger transients.

4 Poster Abstracts

1. A Dedicated UV Space Observatory for Rapid Follow-up of Astrophysical Transients

Richard Archer (BLue Skies Space)

Rapid ultraviolet observations provide a unique window into the early time physics of transient and variable astrophysical phenomena, including supernovae, tidal disruption events, stellar flares and other targets of opportunity. However, access to responsive UV observations from space remains limited, creating an important gap alongside the rapidly expanding capabilities of wide-field optical and multi-messenger surveys.

Blue Skies Space is exploring the concept for a new dedicated space-based UV observatory designed specifically for rapid follow-up of transient events. Building on the development and operation of Mauve, our recently launched UV-visible science satellite, the concept aims to provide the community with flexible, responsive access to UV observations on timescales of hours rather than days.

Over recent months, we have been consulting with researchers across the transient community to understand the science cases and observational requirements that should drive such a mission, including wavelength coverage, sensitivity, cadence, response time and modes of access.

This poster presents the emerging mission concept and the scientific requirements identified through these discussions. We particularly welcome input from the UK transient community on the capabilities that would provide the greatest scientific value.

2. Automated optical follow-up of Swift GRBs with Palomar-60 inch telescope: sample characteristics

Aleksandra Bochenek (Liverpool John Moores University

We present the unbiased study of GRB optical afterglows utilizing the complete dataset from the Palomar 60-inch (P60) automated follow-up programme (2005–2016), probing very early stages of optical afterglow evolution. P60 observed 87 bursts within one hour of the Swift trigger, with a median response time at 260 s post trigger and typical limiting magnitude of r 20.5 mag in 60 seconds. We characterize the intrinsic and observed distributions of key parameters, such as the time-dependent luminosity, decay and spectral indices. We also characterise rates of early afterglow optical variability and peak times of the light-curves. Using our data together with available Swift-XRT data, we examine implications for the circumburst environment. The sample provides insight into the population of fast-decaying and low-luminosity GRBs, bridging the gap to the parameter space currently being explored by Einstein Probe and SVOM.

3. Joint optical-radio modelling of superluminous supernovae with Redback: magnetar vs. CSM discrimination

Sorcha Riain Kennelly (Liverpool John Moores University)

Superluminous supernovae (SLSNe) are exceptionally bright events that provide critical insights into stellar evolution and the early universe. However, it remains unclear what powers these phenomena. SLSNe Type I are believed to be powered by magnetars or interaction with circumstellar material (CSM). While both scenarios predict radio emission, they differ significantly in predicted timescales, fluxes, and spectra.

I will present a joint optical-radio model within Redback intended to better constrain parameters and discriminate between the potential power sources. Utilising joint likelihoods, this technique is first validated on simulated magnetar- and CSM-powered SLSNe, then applied to existing radio detected supernovae, SN2017ens and PTF10hgi. Optical and radio only modelling was completed on the same supernovae sample to facilitate comparisons between the results.

This research aims to quantify precision improvements in parameter inference and determine if joint multiwavelength modelling can successfully resolve the physical nature of SLSN observations.

4. Burning the BOAT: A Hidden Thermal Component to A Well-Known Beast

Nguyen Minh Khang (Liverpool John Moores University)

Amongst the most luminous of long gamma-ray bursts, GRB 221009A retains the title of the Brightest Of All Time (BOAT). Recent studies on the first-ever JWST spectra of its afterglow found that it appears 'bluer' than expected in its continuum (intrinsic $\beta < 0.5$) with an electron index that is atypical of a classical afterglow ($p < 2$). Building on these studies' latest constraints, we show in this work that there may be a latent thermal component within the JWST spectra which has a temperature luminosity of approximately 1000 K. This shows that the immediate circumstellar medium around the BOAT was heated by the burst itself and that it behaves as predicted by the dust sublimation model from Waxman & Draine (2000). This newfound component harbours substantial clues about the environment surrounding the BOAT, and we can infer directly how it was affected by the burst.

5. Hunting for Gravitationally lensed GRBs

David O'Neill (University of Birmingham)

Strongly lensed supernovae and quasars have enabled novel constraints on H0 via the arrival time difference between lensed images, though optical measurements carry uncertainties of ±days. Gamma-Ray Bursts (GRBs) offer a compelling alternative as their prompt emission is measurable with sub-second precision, potentially improving H0 precision by an order of magnitude. Beyond cosmology, a lensed GRB would, for the first time, enable direct probing of multiple lines of sight through the jet, providing unique constraints on GRB jet structure. Galaxy/cluster scale lenses would produce arrival time differences of days to years, with each lensed image appearing as a spatially coincident GRB with similar prompt emission. Despite this significant scientific potential, no strongly lensed GRB has been confirmed. Here, I present a new search across the Fermi and Swift catalogues, identify the most promising candidates, and describe a pipeline for real-time identification of lensed GRBs.

6. SN2023ixf Re-Brightening, a Radio and Optical Synergy

Diane Swan (Lancashire University)

In progress, quick summary - Core collapse supernova, SN2023ixf, is perhaps the most studied event of this type, however, following notification of a possible re-brightening, (Simongini et al. 2025), episode, we obtained time on eMERLIN to observe in radio and had multiple detections. In light of the radio data we were granted time on HST in the FUV and UV spectral window. In this paper we primarily consider findings from the HST data.

I hope to include more analysis of the radio data as well.

7. Analysing SNe Ia decline-rates over various timebases; $\Delta m10(B)$ and more

Joel Velasco (Liverpool John Moores University)

We present an explorative study of Type Ia Supernova (SN Ia), utilising $\Delta mt(X)$ decline-rates to test for alternative methods of accurately encapsulating SN Ia light curve diversity and the Width-Luminosity Relation (WLR). Using a combined dataset of 333 SNe Ia from the Carnegie Supernova Project (CSP-I and CSP-II), we employ Gaussian Process regression to fit B-band light curves and measure decline-rates over various timebases. We find that $\Delta m10(B)$, and $\Delta m10(g)$, effectively capture the WLR while mitigating the degeneracy observed over longer intervals in fast-declining, 1991bg-like SNe. Our results demonstrate that $\Delta m10(B)$ tracks the luminosity range continuously, particularly for transitional SNe, which appear as a natural extension of the normal SNe Ia population. Furthermore, we show that $\Delta m10(B)$ closely approximates the results of the more complex sBV parameter, successfully tracing luminosity with minimal data requirements. We provide calibration equations, including a quadratic fit for non-91bg-like SNe that yields a low intrinsic scatter of 0.076 mag. Requiring less post-maximum temporal coverage than its predecessor, $\Delta m10(B)$ is a robust and useful tool for large-scale photometric surveys and real-time observer classification.

8. Exploring Photometric Subpopulations of Stripped-Envelope Supernovae with ZTF

Yogesh Wagh (Liverpool John Moores University

Type Ib and Ic supernovae arise from massive stars stripped of their hydrogen envelopes before explosion, but the relative roles of the proposed mechanisms—line-driven winds, binary stripping, and common-envelope interaction—remain poorly constrained. Observations alone cannot yet reveal whether a given SN Ib/c progenitor was binary-stripped or a massive single star, a distinction central to massive-star evolution, binary statistics, and the initial mass function. We present an ongoing study of the SN Ib/c population using uniformly selected ZTF Bright Transient Survey light curves and spectra. Perley et al. (2020) found that these events do not form an isolated cluster in timescale–luminosity space but overlap with SLSNe; we now revisit this with roughly four times the sample. Through sample cleaning, light-curve classification, model fitting for parameters such as ejecta mass, and machine-learning identification of photometric subgroups, we test whether the subgroups trace distinct progenitor channels, later adding host-galaxy constraints.

9. A population synthesis and TeV prediction of long GRBs using the BAT6 sample

Jianghui Yuan (University of Bath

The broadband spectra of individual long gamma-ray bursts (GRBs) are often used to model the physics responsible for these events, including energetics, magnetization, environment density, and electron-acceleration efficiency. However, given that we have high-quality samples including the BAT6 sample, it is also possible to fit at population level, in order to establish the distributions of burst properties rather than individual cases. Using the structured-jet GRB afterglow modelling code “Afterglowpy”, I will present an analysis of BAT6 prompt and afterglow properties (radio, optical, X-rays) used to constrain the distributions of burst physics and environments. This in turn allows for population synthesis studies calibrated on real data, and we proceed to make predictions for the TeV domain, augmenting Afterglowpy with a Compton upscattering feature.