Introductory talks

- **Stars, disks**
  - Frenel, Takeda, Turner, Kalari, Nicholl
- **Nebulae, AGB stars**
  - Prozesky, Belay, Reindl, Bulla,
- **ISM**
  - Fox, Gale-Sides, Lan, Smart, McEvoy
- **AGN**
  - Whewel, Adhikari, Silva, Laha, Bessiere
- **Starbursts, host galaxies**
  - Polshaw, Chen, Meskhidze, Tunnard

Stars, disks

- Frenel
- Takeda
- Turner
- Kalari
- Nicholl

Thomas Finzell

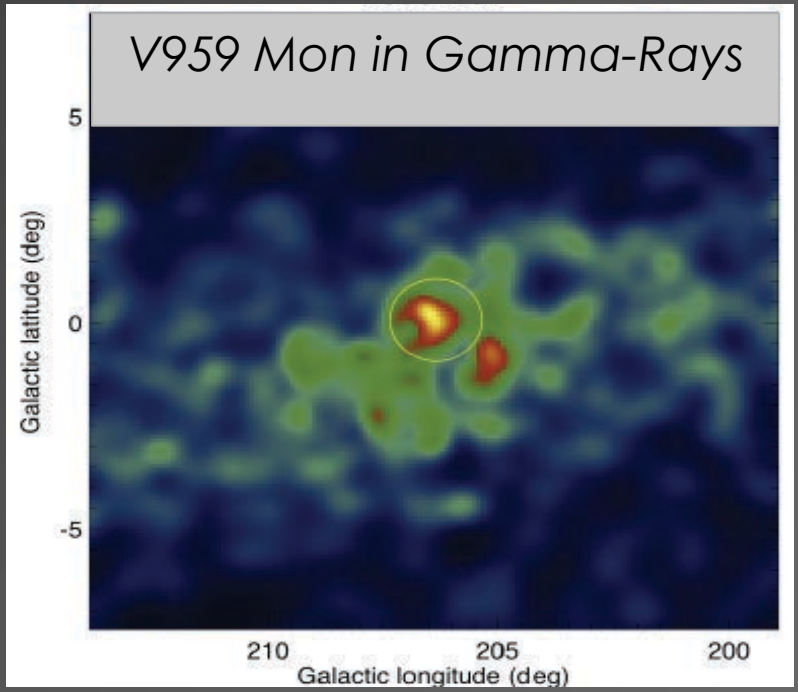
Entering 4th year as PhD student at Michigan State University

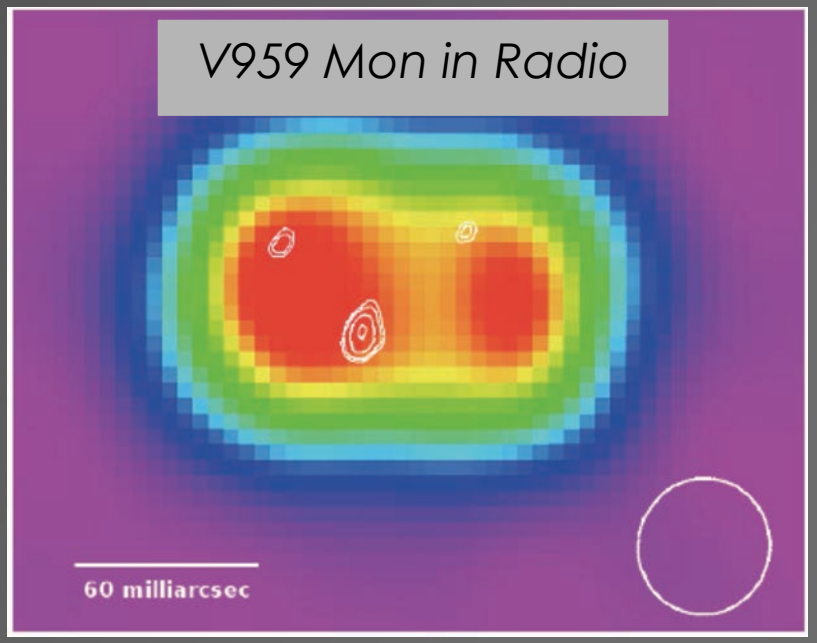
Working on classical novae with Laura Chomiuk

Multiwavelength observations from gamma-rays to radio

Lots of data; need new methods of analysis

Use CLOUDY to determine elemental abundances, trace ionization in time, etc.





Larissa Takeda
University of Sao Paulo
Institute of Astronomy, Geophysics and Atmospheric Sciences

Main interest: Novae!

Previous research with CLOUDY: Balmer line fluxes emitted by different nova components.

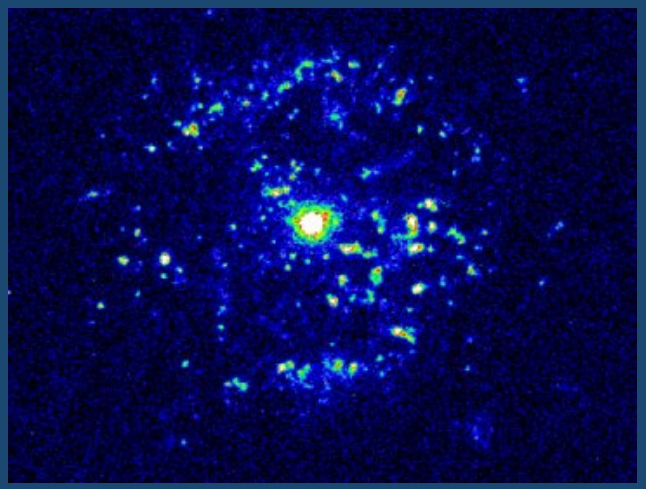
TABLE 1

HEAVY ELEMENT ABUNDANCES IN NOVAE

Object	Year	Ref.	Mass Fractions H	He	C	N	O	Ne	Na-Fe	Z	$(Z/Z_\odot)$	$(Ne/Ne_\odot)$	(Ne/Z)
PW Vul	1984	8	0.69	0.25	0.0033	0.049	0.014	0.00066		0.067	3.5	.38	0.52
PW Vul	1984	5	0.54	0.28	0.032	0.11	0.038			0.18	9.5		
PW Vul	1984	1	0.47	0.23	0.073	0.14	0.083	0.0040	0.0048	0.30	16.	2.3	0.70

REFERENCES.—(1) Andrea 1992; (2) Dopita et al. 1992; (3) Ferland & Shields 1978; (4) Gallagher et al. 1980; (5) Hassall et al. 1990; (6) Lance et al. 1988; (7) Petitjean et al. 1990; (8) Saizar et al. 1991; (9) Saizar et al. 1992; (10) Snijders et al. 1987; (11) Strickland et al. 1981; (12) Tylenda 1978; (13) Williams & Gallagher 1979; (14) Williams et al. 1985; (15) Williams et al. 1978.

Livio & Truran, 1994



Now: Understand the influence of the envelope's mass distribution when estimating heavy element abundances in novae.

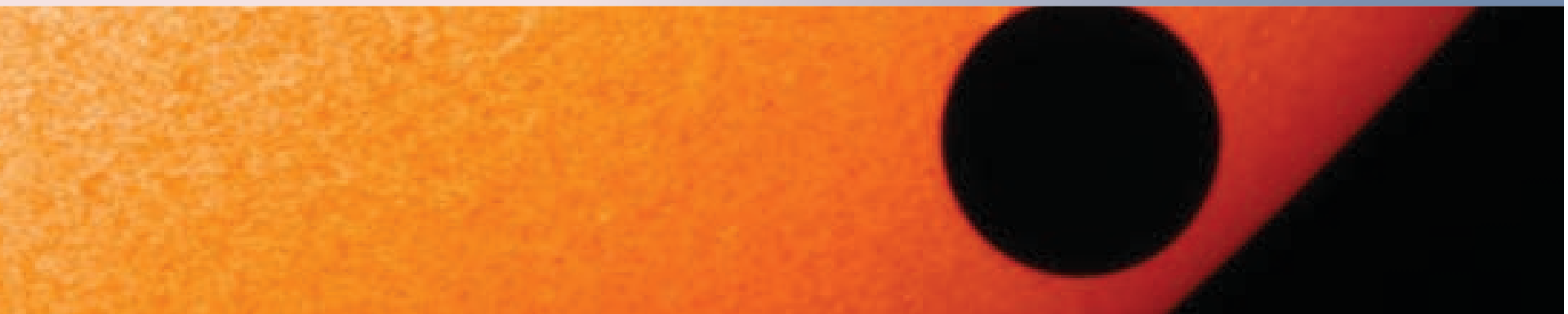
Jake Turner
University of Virginia

Background

- First Year PhD Student at University of Virginia
- Undergraduate degree at University of Arizona
- Worked at the Lunar and Planetary Laboratory for two years after graduation.

Research Background

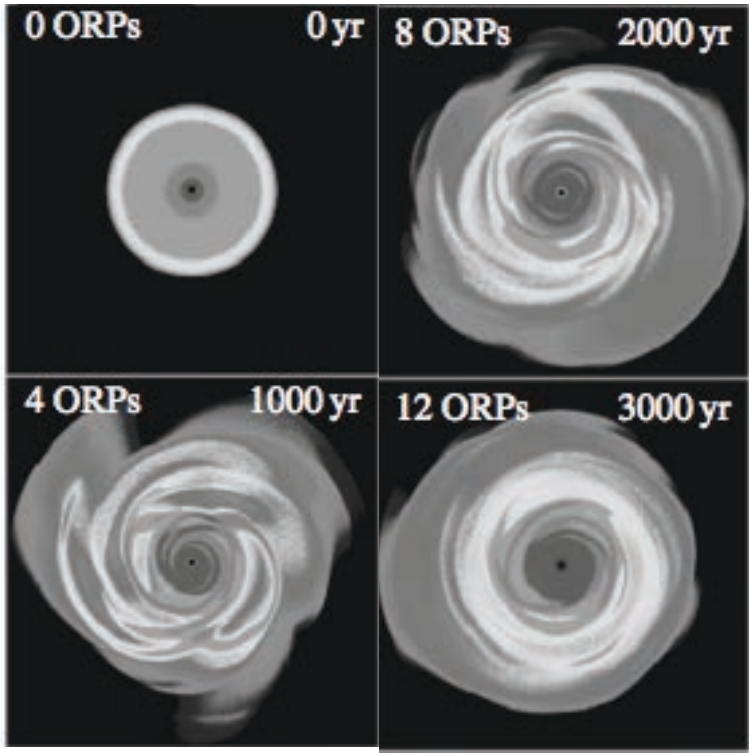
- Studying the atmosphere, methane lakes, and surface composition on Titan using Cassini.
- Atmospheric and magnetic field characterization of transiting exoplanets

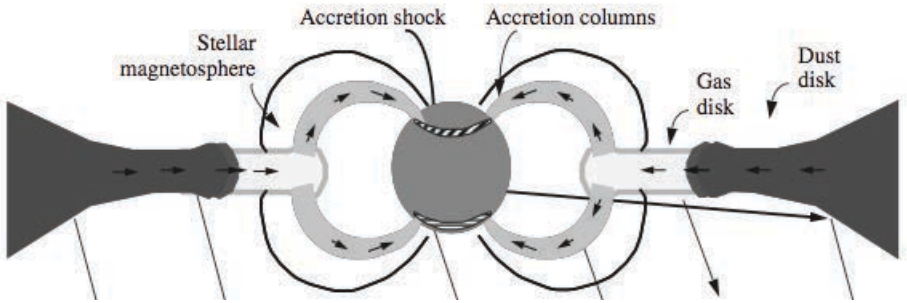


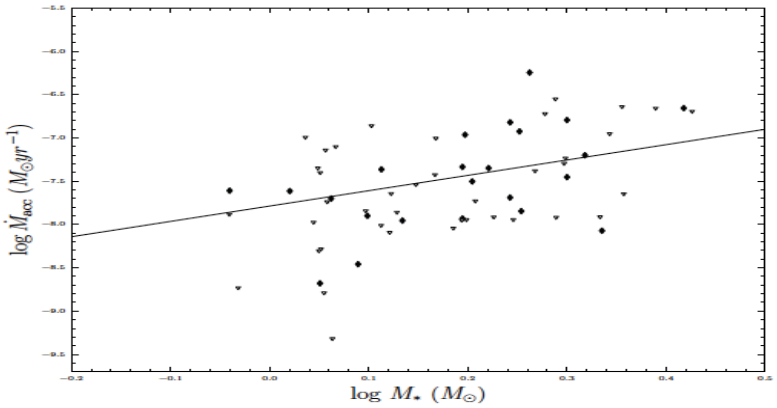
Evolution of circumstellar discs

Venu Kalari, Armagh

- Disc evolution defines PMS stellar evolution phase
- Current models unable to reproduce observations



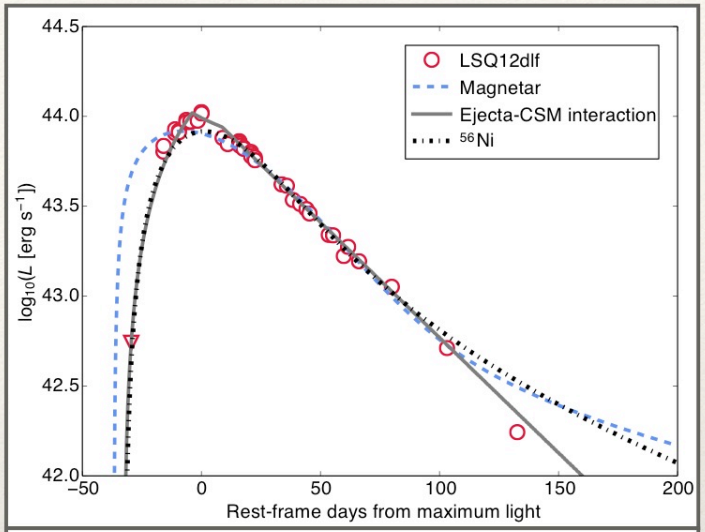


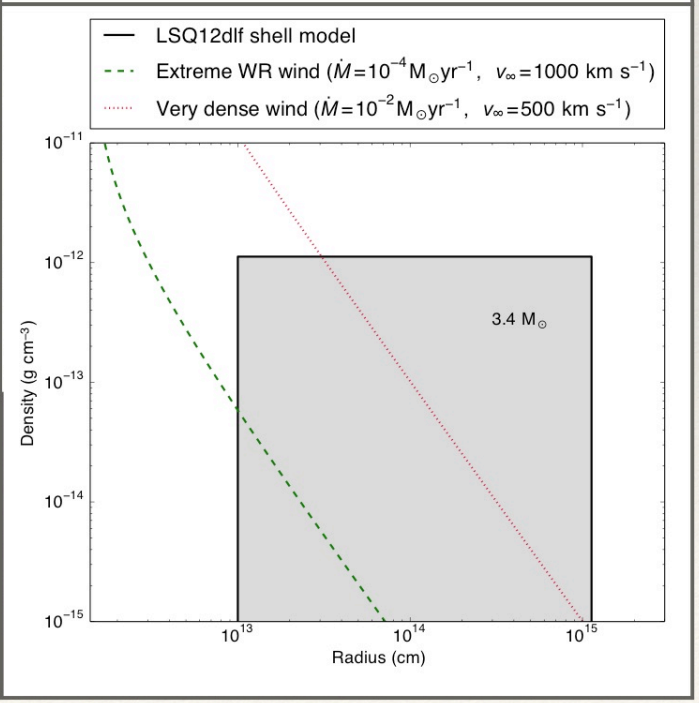


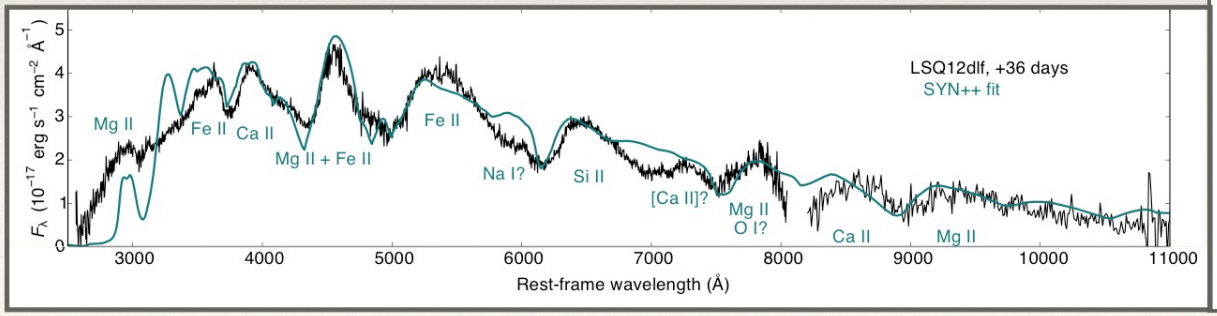
Matt Nicholl

Queen's University Belfast

- PhD student at QUB
- Topic: super-luminous supernovae
  - CSM interaction, ms magnetar, or other?
- Observations:
  - Light curves and spectral analysis — bolometric output, velocity, temperature…
- Modelling:
  - Fit luminosity with magnetar, CSM etc
  - Spectral models with SYNOW







Nebulae, AGB stars

- Prozesky
- Belay
- Reindl
- Bulla

Andri Prozesky

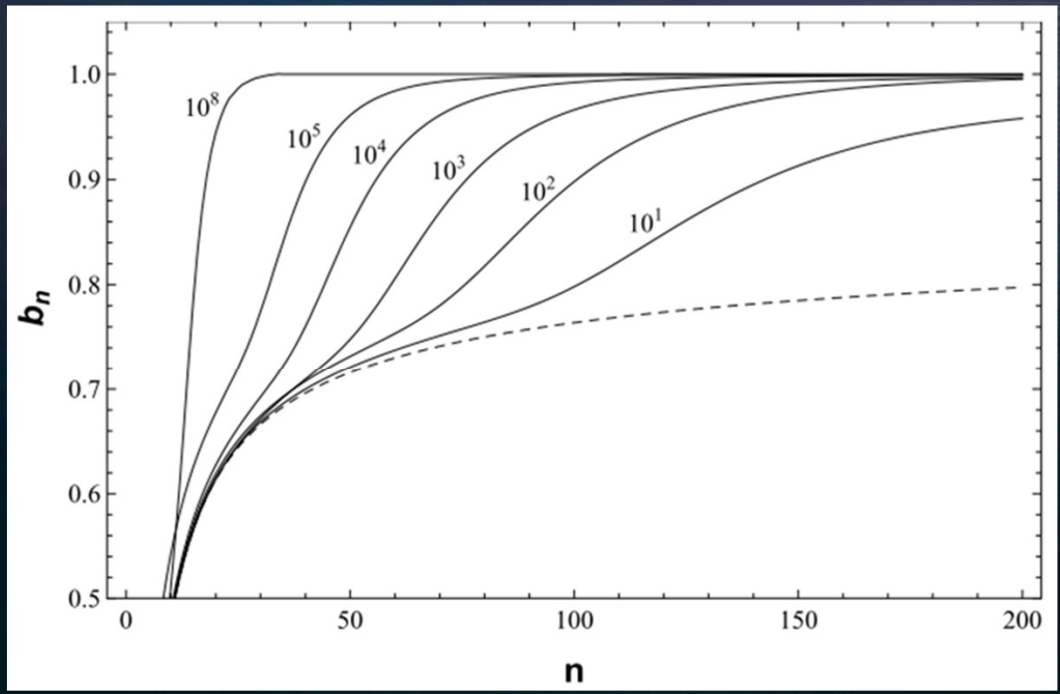
Computer model that simulates atomic processes in photoionized nebulae

Current work:

- Accurate results for RRLs
- Effects of stimulated processes
- Elemental abundance discrepancy

Future work:

- Include metals
- General radiation field
- Radiative transfer



The impacts of heavy metals on modelling of photo ionization

Goshu Belay

- 3rd year PhD student
- South Africa University(UNISA)
- Msc in Space Physics
- Research Interest
- On the ionization structure of heavy metals based on cloudy code
- Model of Hydrogen deficient nebulae at low temperature and high temperature: for uniform and non uniform distribution of hydrogen density
- Planetary nebul
- H II region

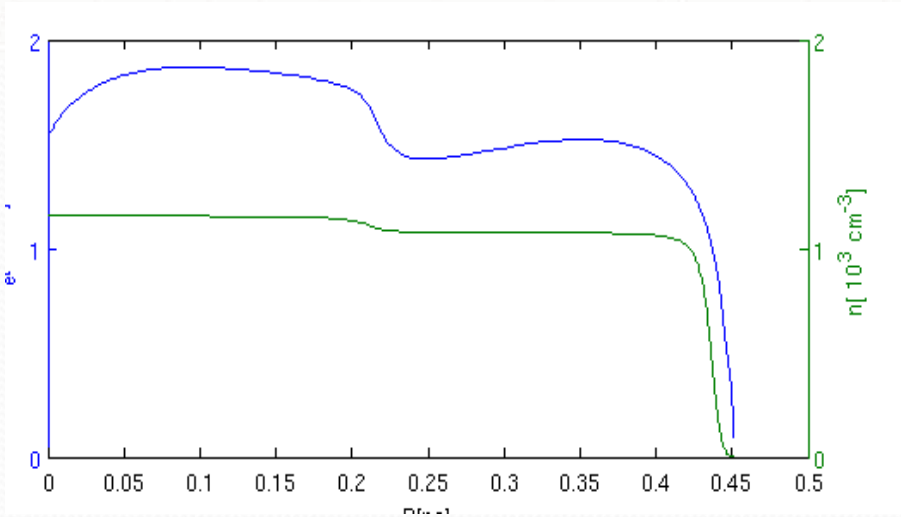
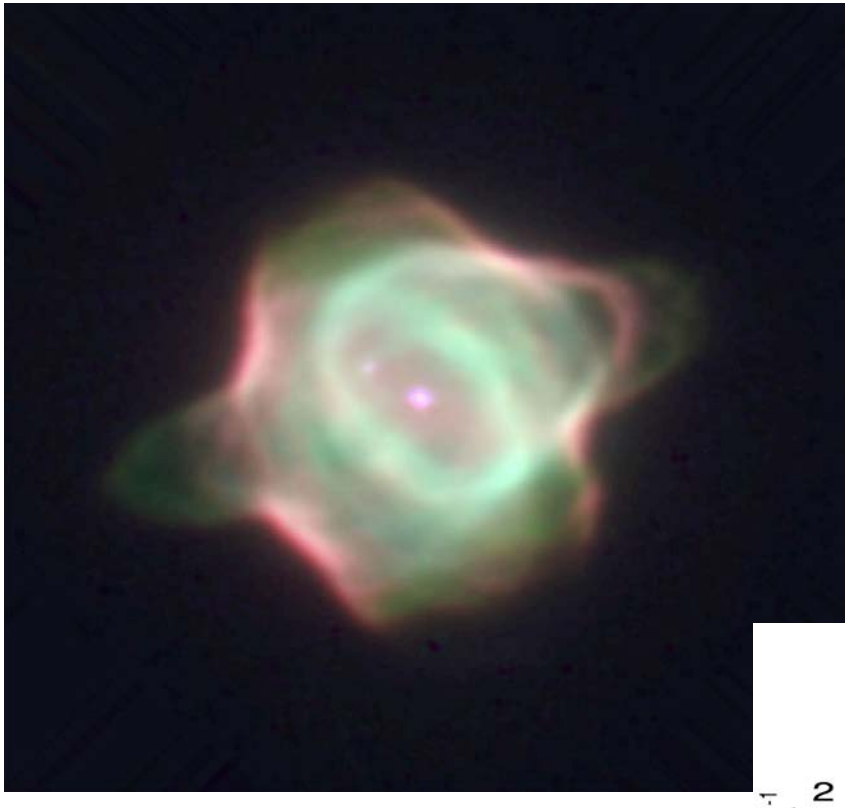
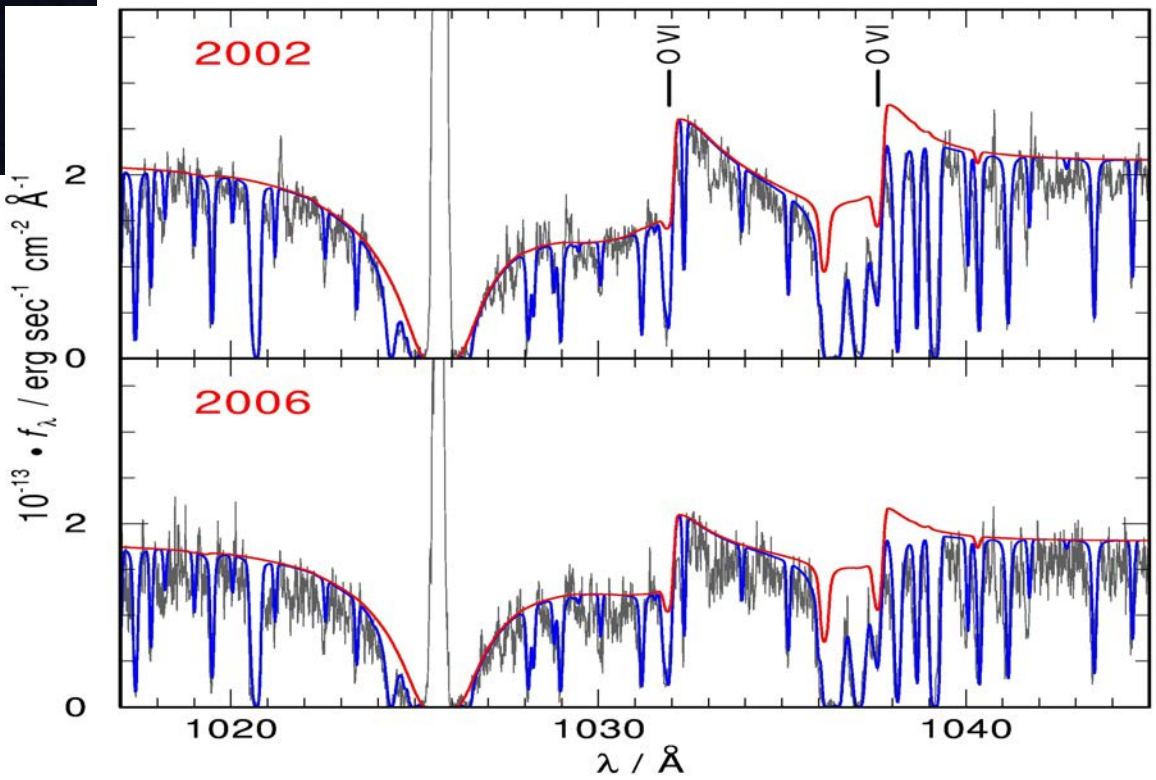


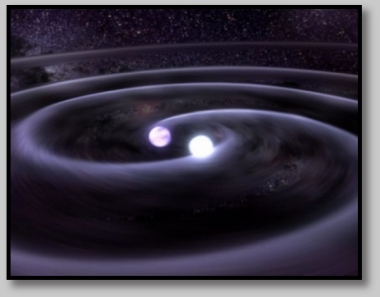
Figure 1: The calculated profile of the ionized region for the model luminosity log(L)=38.0, log(T)=5 K, filling factor =1.0, abundances of oxygen and carbon are log(O/H)=-5.25 and log(C/H)=-6.00 respectively and NH =1 000 cm□3. The left panel shows the temperature and electron number density profile

belaysitotaw“@gmail.com



Reindl

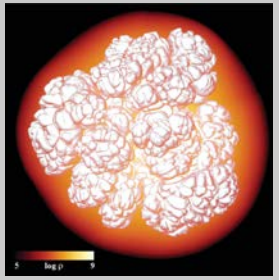

2002
2006
O VI
O VI
2
0
2
0
10^{-13} • f_λ / erg sec^{-1} cm^{-2} Å^{-1}
1020
1030
1040
λ / Å



Mattia Bulla

Queen's University Belfast

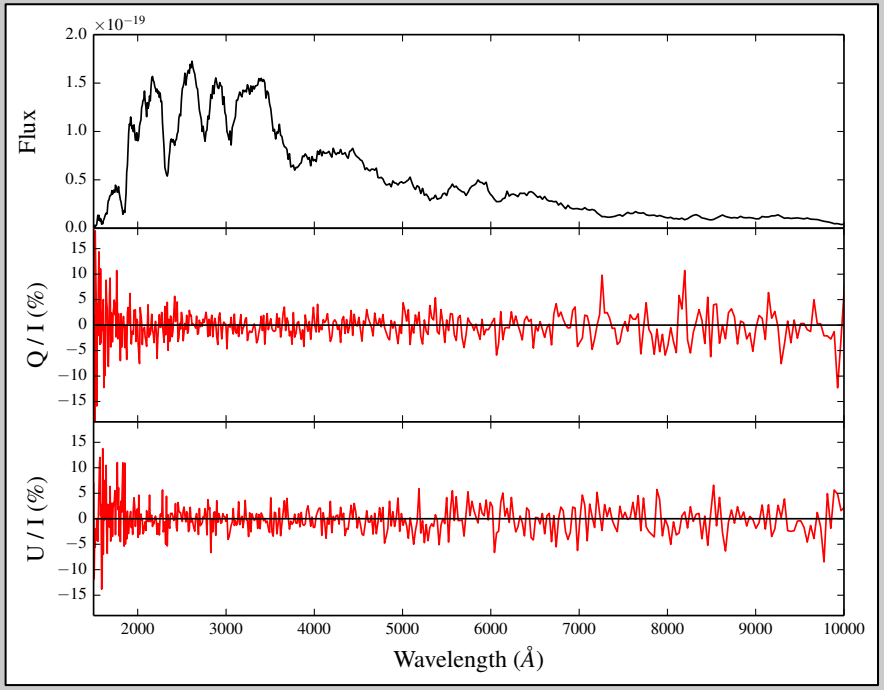
1st year PhD student



Type Ia Supernovae

Research Interests:

- Observational study of viable progenitor systems
- Radiative transfer calculations
- Theoretical modelling of polarisation spectra

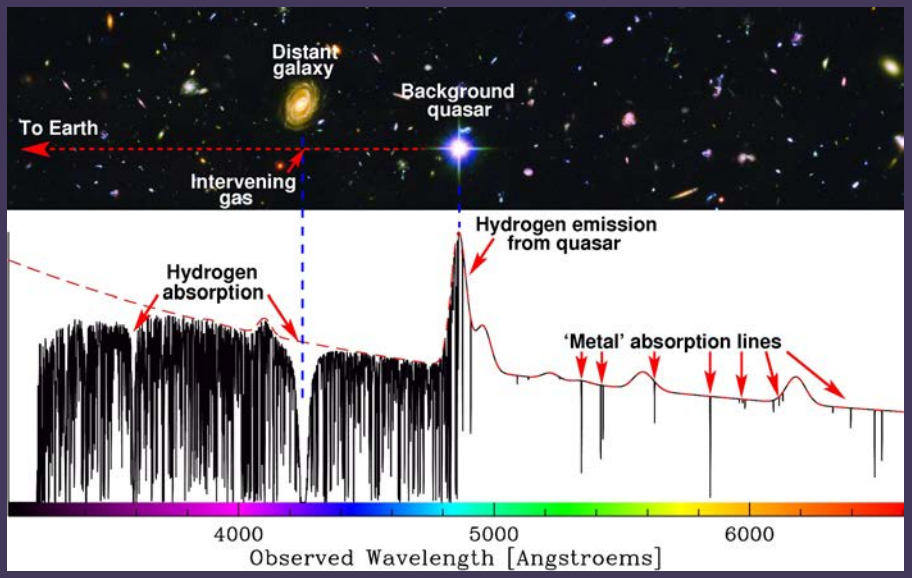


⟶ Ionisation conditions around Type Ia Supernovae…

ISM

- Fox
- Gale-Sides
- Lan
- Smart
- McEvoy

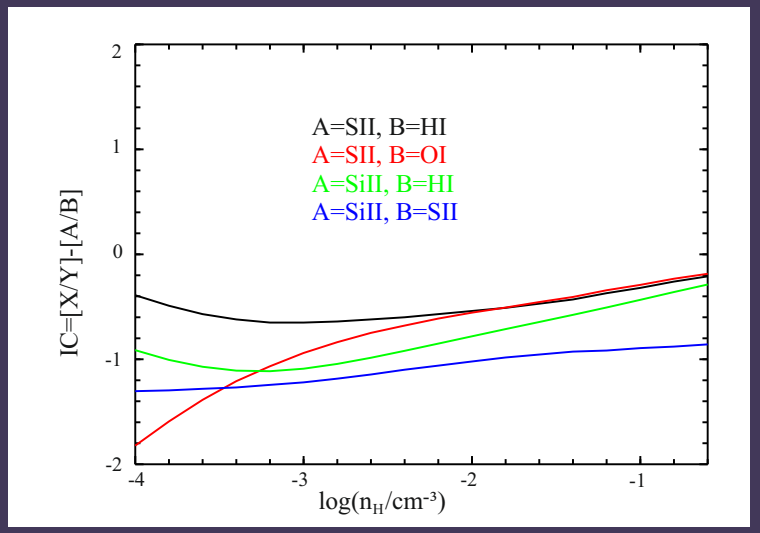
Anne Fox
University of Potsdam, Germany
Leibniz Graduate School for Quantitative Spectroscopy in Astrophysics



http://www.eso.org/ jliske/qsoal/

Research Interests:

- intergalactic gas (high resolution at high redshift)
- quasar spectra → absorption line spectroscopy
- correlation between absorbers and galaxies
- chemical composition of intervening gas clouds → ionisation corrections
- ionisation conditions in gas in the vicinity of quasars (proximity effect)



A. Fox, P. Richter, C. Fechner in prep.

Climate and Weather of the ISM

Kingsley Gale-Sides

Keele University

Background:

- 1st year PhD student
- Previous studies include HPC code optimization for UK Met Office (MSc)

Observing:

- Using ATCA
- HI in SMC

Research interests:

- Interplay between ISM at various scale sizes
- High resolution HI observations of ISM structure
- Molecular cloud morphology
- HI absorption studies of small scale ISM structure
- Simulation of structural and compositional evolution

k.t.gale-sides@keele.ac.uk

Ting-Wen Lan

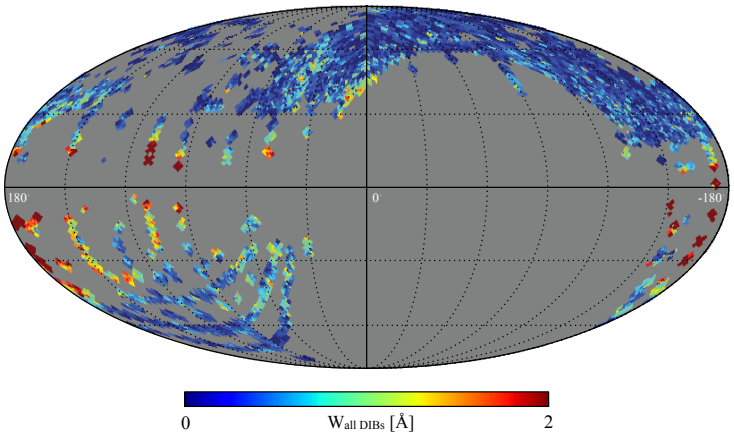
Ph.D student,
Johns Hopkins University

My research interests:

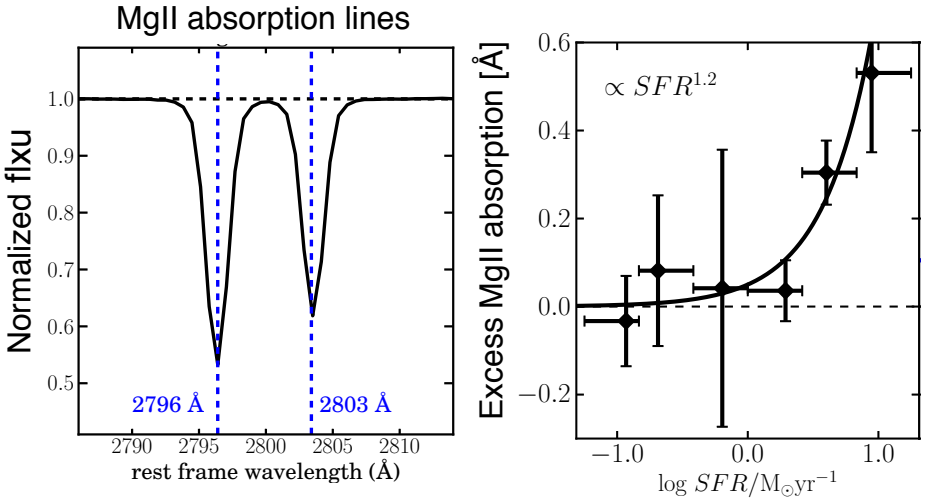
Making use of data from large surveys to explore

- correlations between diffuse interstellar bands (DIBs) and ISM tracers and the nature of DIBs (arXiv:1406.7284)
- the link between galaxies and the circumgalactic medium (CGM) traced by MgII absorbers (arXiv:1404.5301)

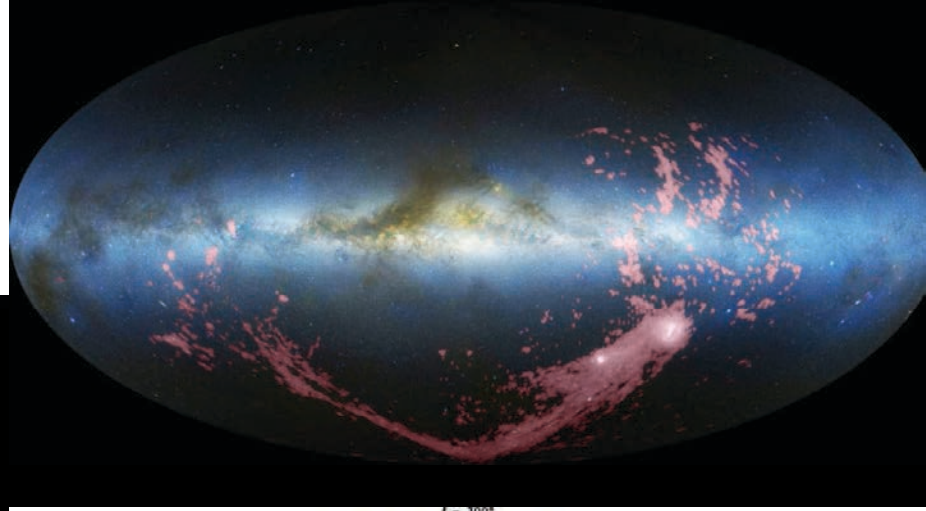
The diffuse interstellar band absorption map



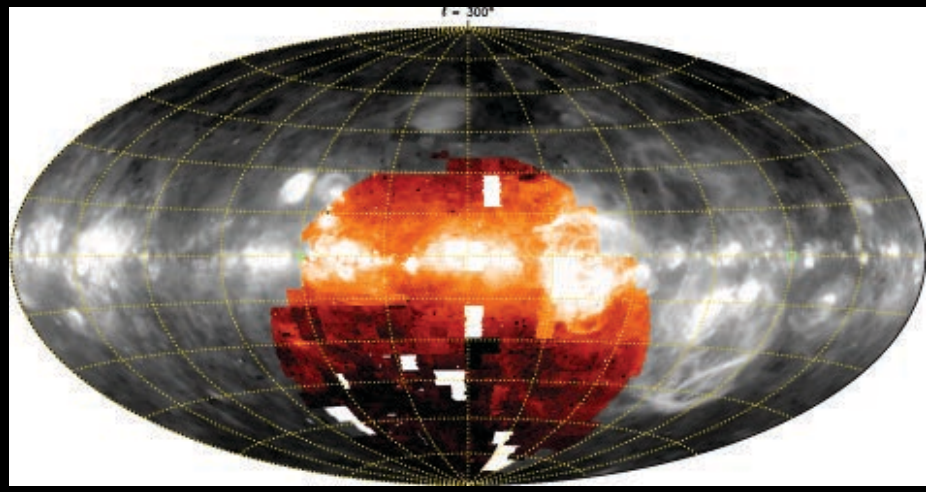
MgII absorption lines

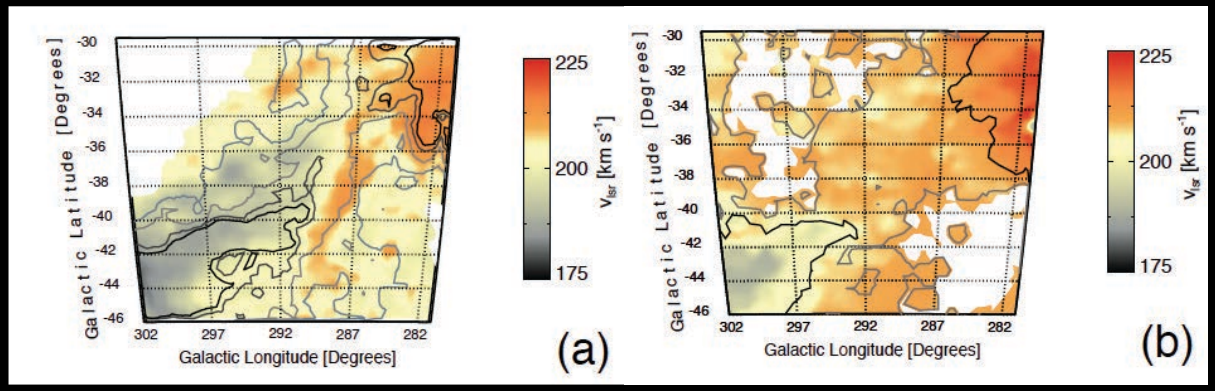


Brianna Smart



- First Year PhD student at UW-Madison. Working in the Wisconsin H-α Mapper (WHAM) group under Matt Haffner.
- Working on finishing H-α maps of the LMC and SMC
- Starting an H-α survey of the Magellanic Stream in September
- Research Interests
  - History of the Magellanic System
  - Radiative processes in the ISM





Catherine McEvoy

Queen's University Belfast

PhD student at QUB

Area of Research:

Fine scale structure of the ISM

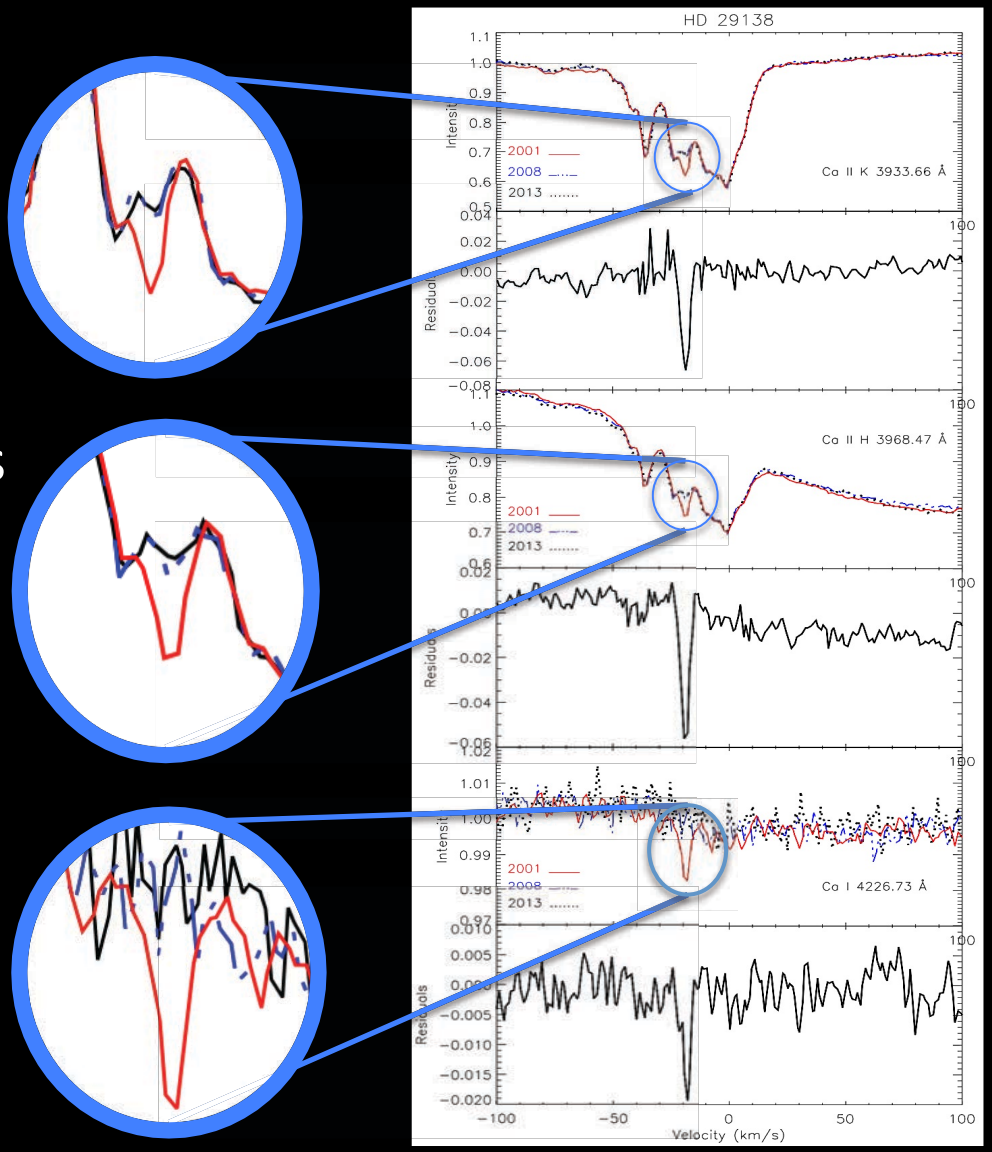
– A search for temporal variation in ISM line profiles

Observations:

– Double epoch optical absorption spectra

Possible use of CLOUDY:

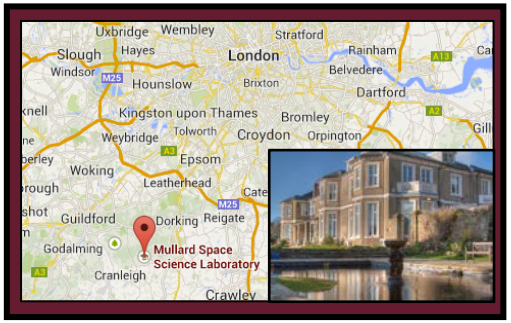
– to better characterize the physical conditions of the clouds (include UV data from literature).



AGN

- Whewel
- Adhikari
- Silva
- Laha
- Bessiere

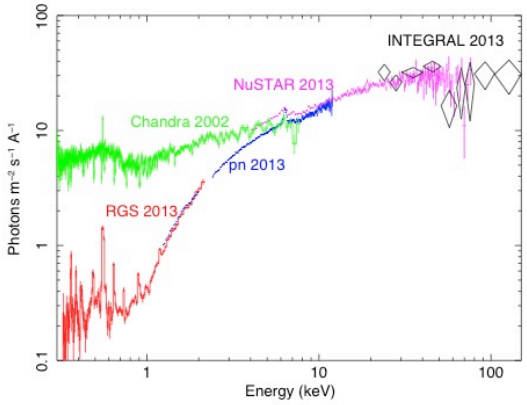
Megan Whewell
PhD student (1st year)
Mullard Space Science Laboratory,
University College London, UK



This work is part of the NGC 5548 collaboration led by Prof. Jelle Kaastra.

First paper by this collaboration:
Kaastra, J. et al, "A fast and long-lived outflow from the supermassive black hole in NGC 5548", *Science*, **345**, 6192, (2014)

Fig. 1



NGC 5548 Campaign (June 2013 – February 2014)

- New obscuring material discovered, causing soft X-ray (0.1 – 2 keV) flux to be 25 times weaker than median observations in 2002 (Fig. 1) (Kaastra et al; 2014)

Observations with XMM-Newton's Reflection Grating Spectrometer (RGS)

- 12 observations of ~50 ks, each separated by a few days over June 2013 - July 2013
- These observations have been stacked into one 660 ks spectrum (Fig. 2)
- **I am studying the narrow emission features of this spectrum (Fig. 2)**

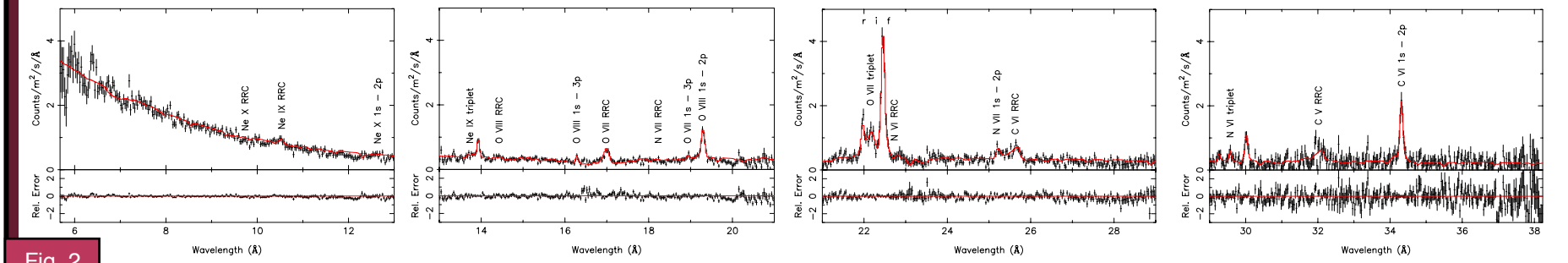
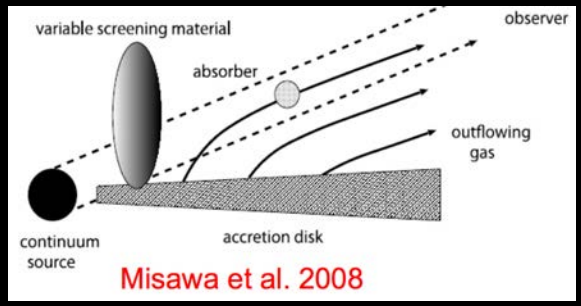


Fig. 2

Tek Prasad Adhikari
PhD - I year
Supervisor: Agata Rozanska
Nicolaus Copernicus Astronomical Center
(NCAC), Warsaw, Poland

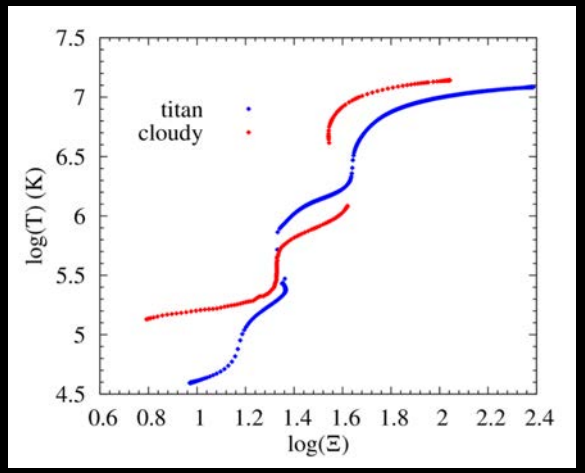


Research Interests:

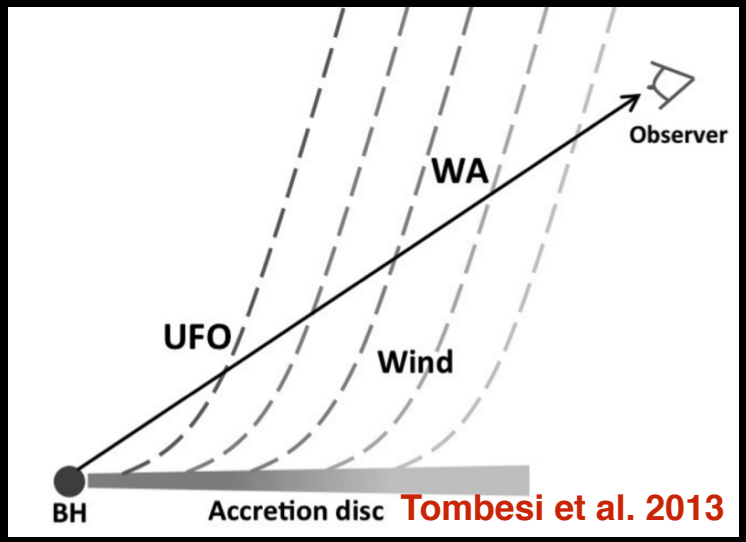
Modelling the warm absorber (WA) in AGNs

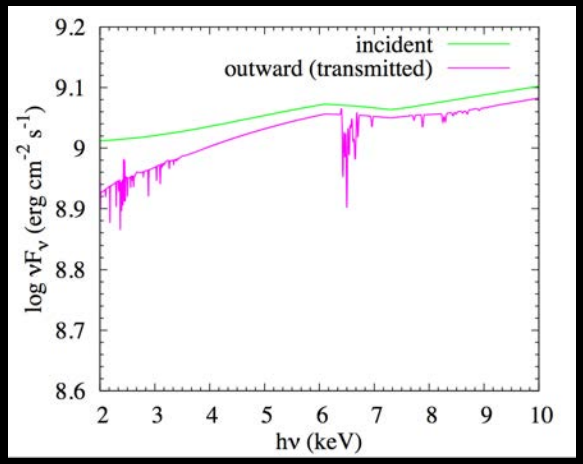
Effect of WA on broad Fe line

Thermal Instability in the Galactic centre



AGN wind unification





CATIA SILVA

PHD STUDENT (1ST YEAR) *AT* API, AMSTERDAM
WITH ELISA COSTANTINI & PHIL UTTLEY

- Combine spectral fitting and timing analysis to a detailed study of warm absorbers in AGN

- Modeling time lags related to the response time of the absorber related to changes in the ionizing continuum

Adapted from F. Tombesi (2013)

ANTON PANNEKOEK INSTITUUT

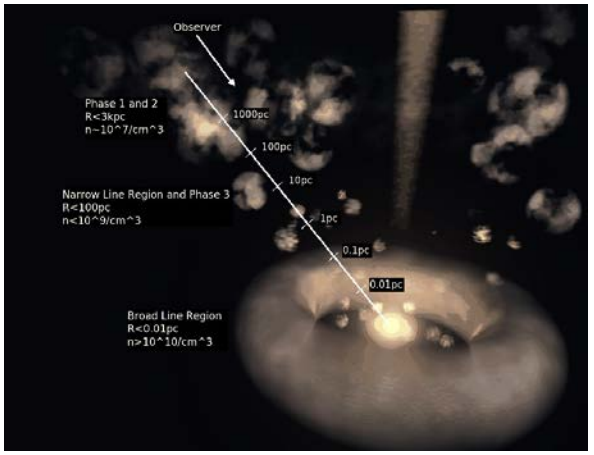
SRON Netherlands Institute for Space Research

Warm absorbers in X-rays (WAX)

Sibasish Laha

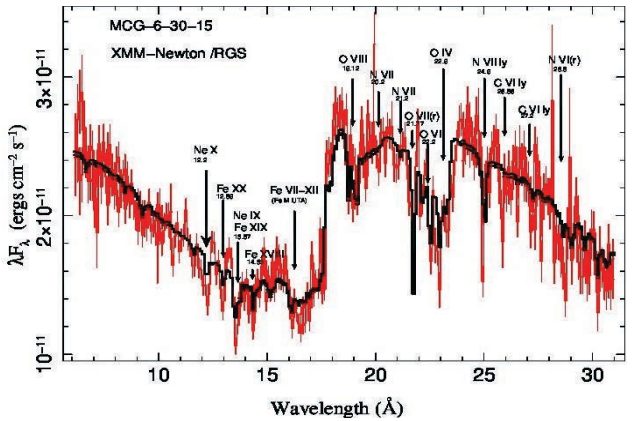
(post-doctoral research fellow, Queen's University, Belfast)

The X-ray spectra of AGN shows signatures of ionised absorption >> warm absorbers



These WA are important disgnostics of the materials around the central engine...

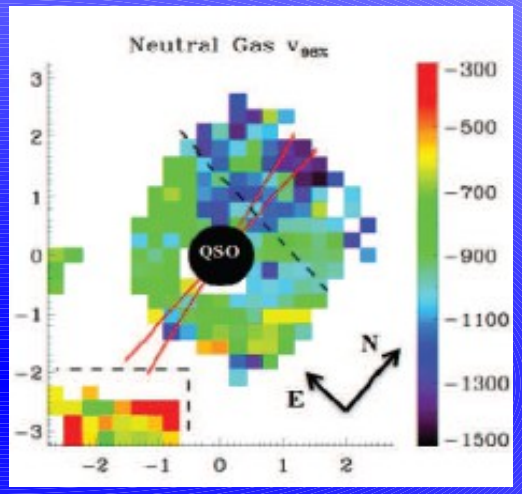
An extensive observational study of the warm absorbers in an AGN sample has been carried out as a part of my thesis work.



2014...MNRAS....441....2613L

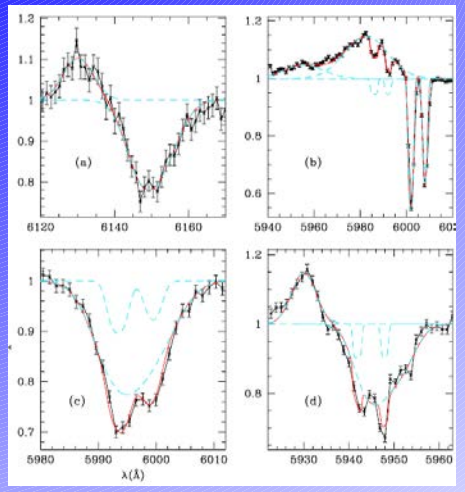
Patricia Bessiere
University of Sheffield

- Just finishing my PhD and am starting a new project as a postdoc.
- AGN are thought to perform a vital role in galaxy evolution through feedback.
- New project entails attempting to trace AGN driven feedback in radio-loud AGN, through neutral outflows.



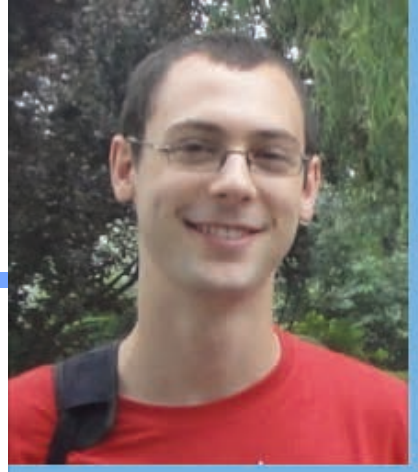
Villeux 2012

Krung+ 2010



Starbursts, host galaxies

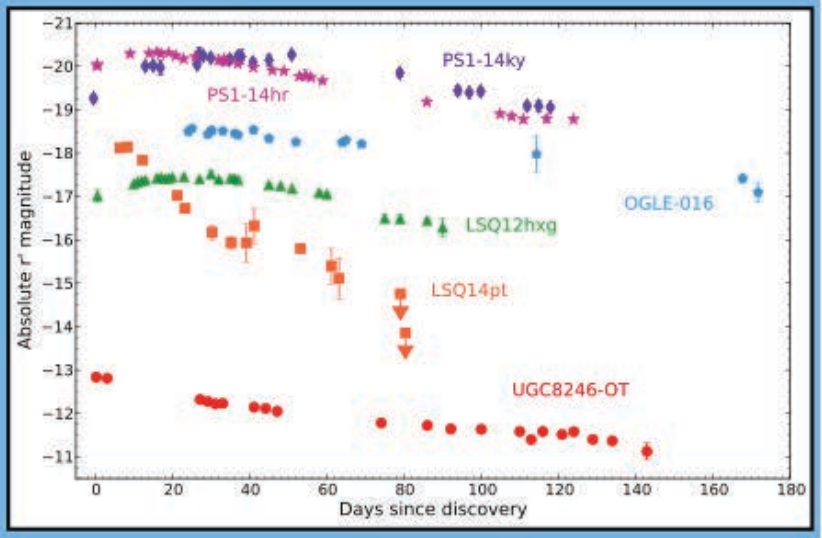
- Polshaw
- Chen
- Meskhidze
- Tunnard



Joe Polshaw

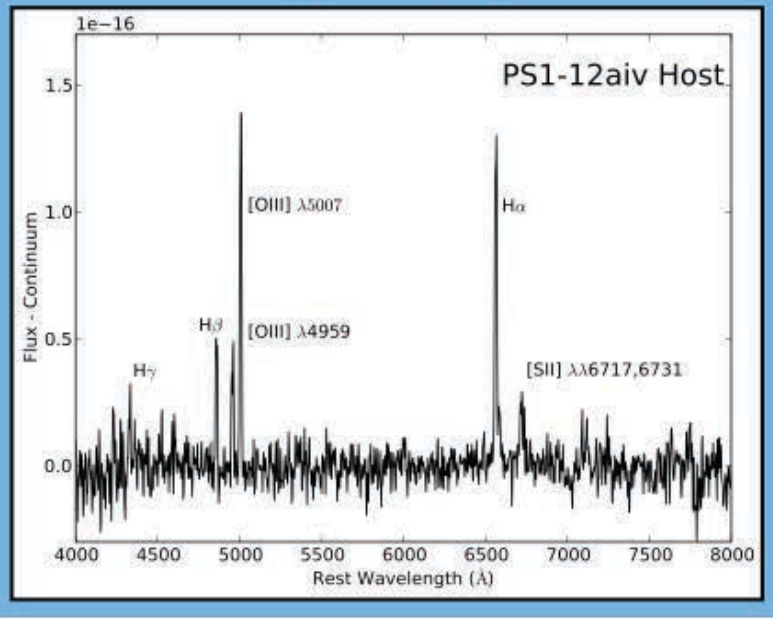
Queen's University Belfast

I am a second year PhD student in the supernova group, QUB.



Research interests:

- Diversity of interacting supernovae (type IIn, imposters) - analysing light curves and spectra.
- Unusual transients in the "luminosity gap".
- Unusual type II-P supernovae.



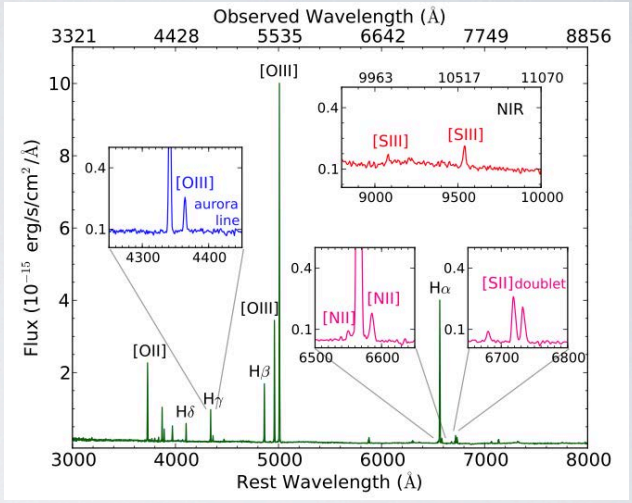
Why Cloudy?

- A growing number of supernovae type Ia have been discovered in very faint host galaxies, which are believed to be extremely metal poor.
- The metallicity of the progenitor system may be a key parameter for the explosion mechanism.
- Analysis of the spectra of their host galaxies allows us to estimate the metallicity of the progenitor environment.

Janet Chen

Queen's University Belfast

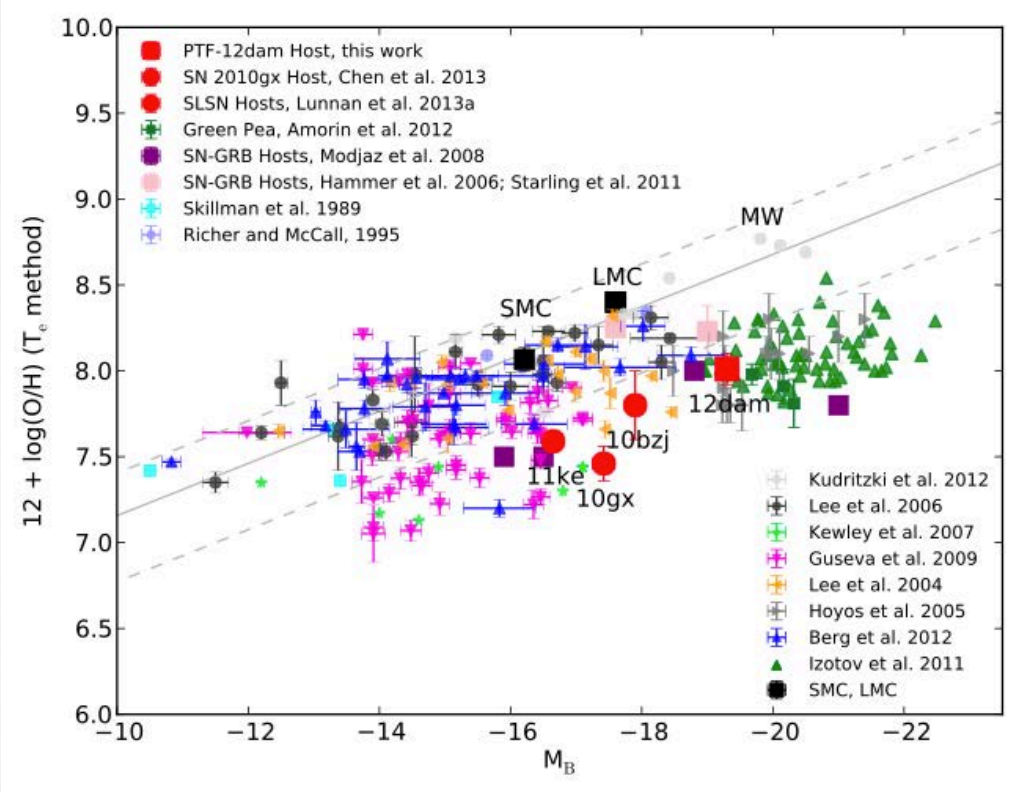
Research interests:
Host galaxy environment of super-luminous supernova



Super-luminous supernovae of type Ic have a tendency to occur in faint host galaxies which are likely to have low mass and low metallicity.

We have found:
The lowest metallicity host of all kind of supernovae, the host of SN 2010gx to have 12+log(O/H) = 7.46 ± 0.10 (= 0.06 $Z_\odot$) with direct method. (Chen et al. 2013)

The extreme emission line host of PTF12dam, e.g. [O III] λ5007 has an equivalent width of EW_{rest} > 560 Å. (Chen et al. in prep.)



Helen Meskhidze

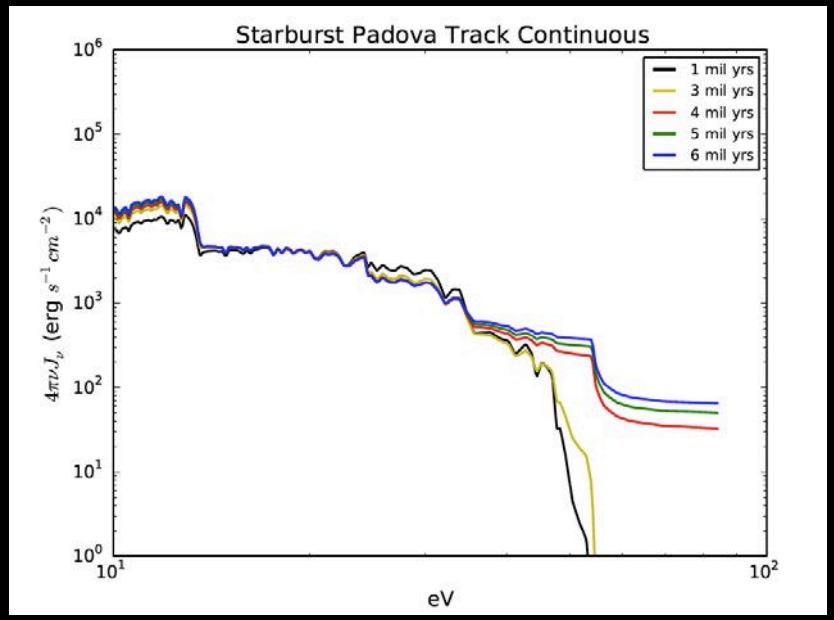
3rd year undergraduate
Elon University

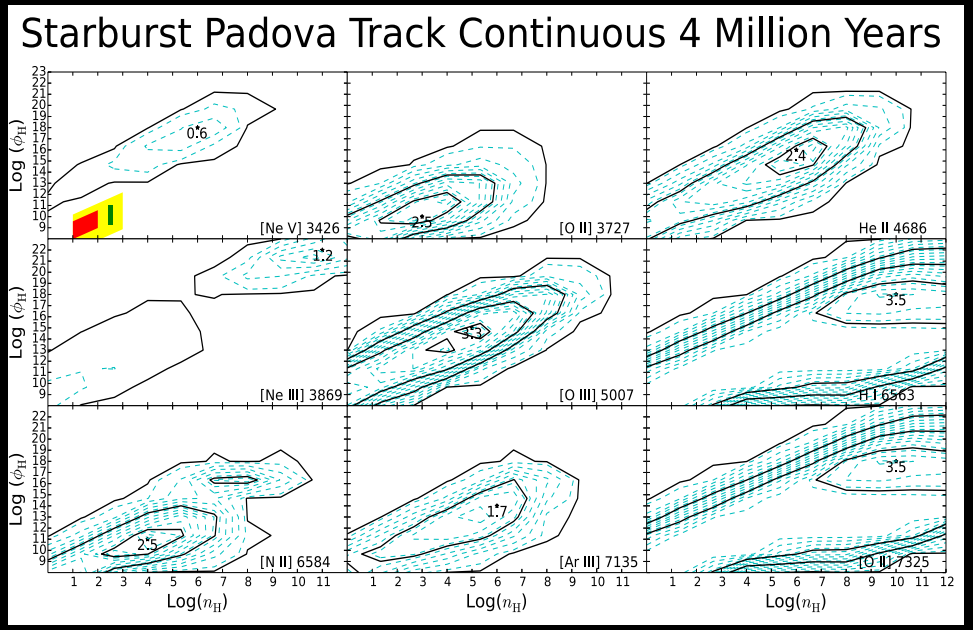
Research interest: Starforming Regions

understanding the dynamics of starforming regions by analyzing the most influential parameters in emission line formation

Process:

- simulations of starburst regions
- simulations of surrounding gas clouds and analysis of resultant emission lines





Richard Tunnard

- First year PhD at UCL working in extragalactic star formation group - supervisor Thomas Greve.
- Currently finishing off a project on the ULIRG Arp220, using millimetre ^{13}C isotopologue lines to identify chemical differences between the nuclei.
- Research interests:
  - HCN and SiO abundances and excitations in extreme conditions: shocks and XDRs.
  - AGN and stellar feedback: how is molecular gas entrained in outflows.
  - HNC - HCN line and abundance ratios as environment tracers and the rôle of mid-IR pumping.