



Summer Projects and Internships

PhysSoc Exec

What opportunities are there in the summer?

Jobs and Industry Experience

- Internships
- Part time work

Research and Academia

- URSS

BRIGHT
NETWORK

// GRADCRACKER
Where the STEM jobs are

URSS
UNDERGRADUATE RESEARCH SUPPORT SCHEME

What is URSS?

- A chance to take on a summer research project
 - Over the course of 6-10 weeks
 - Public engagement activity
 - Poster showcase in November

The screenshot shows the Warwick Undergraduate Research Support Scheme website. At the top left is the Warwick logo. To the right is a search bar with the text "Search Warwick" and a magnifying glass icon. Below the logo is the text "Undergraduate Research Support Scheme". A navigation bar contains links for "Apply", "URSS Experience", and "URSS Affiliates". A large banner with a geometric pattern of triangles in shades of blue and purple features the text "Lead your own Summer Research Project". Below the banner is a light blue box with the text: "We are currently developing these pages. All current content is correct - but come back soon to find more information on URSS." The main content area is divided into three columns. The first column is titled "What is URSS?" and contains a paragraph describing the scheme, a paragraph about its openness to students, and a section "Find out more and apply" with two links: "URSS application form" and "Public engagement application form". The second column is titled "Bursary Support" and contains a paragraph about bursary contributions, a paragraph about the maximum amount (£1500), and a paragraph about the application process. It includes a green button labeled "BURSARY >". The third column is titled "News" and lists three news items with dates and titles: "Tue 10 Oct '23 URSS Showcase Event 2023", "Mon 15 May '23 International Conference of UG Research (ICUR)", and "Fri 21 Jan '22 Get help with your public engagement plan". It also includes a date "Fri 01 Oct '21" and a link "URSS Public Engagement Initiative", followed by a green button labeled "NEWS >".

WARWICK
Undergraduate Research Support Scheme

Apply | URSS Experience | URSS Affiliates

Lead your own Summer Research Project

We are currently developing these pages. All current content is correct - but come back soon to find more information on URSS.

What is URSS?

The Undergraduate Research Support Scheme enables Warwick undergraduate students to carry out an interdisciplinary summer research or public engagement project.

The scheme is open to all undergraduate students from any year or course, with the exception of exchange students. The applications will open on Thursday 16 November.

Find out more and apply

- [URSS application form](#)
- [Public engagement application form](#)

Bursary Support

A URSS bursary can contribute to your living expenses and other associated costs whilst carrying out your project.

Each applicant can request up to a maximum amount of £1500 for home and overseas projects.

In order to apply, you will be required to justify your bursary on the application form by providing a fully researched breakdown of projected costs.

[BURSARY >](#)

News

Tue 10 Oct '23
[URSS Showcase Event 2023](#)

Mon 15 May '23
[International Conference of UG Research \(ICUR\)](#)

Fri 21 Jan '22
[Get help with your public engagement plan](#)

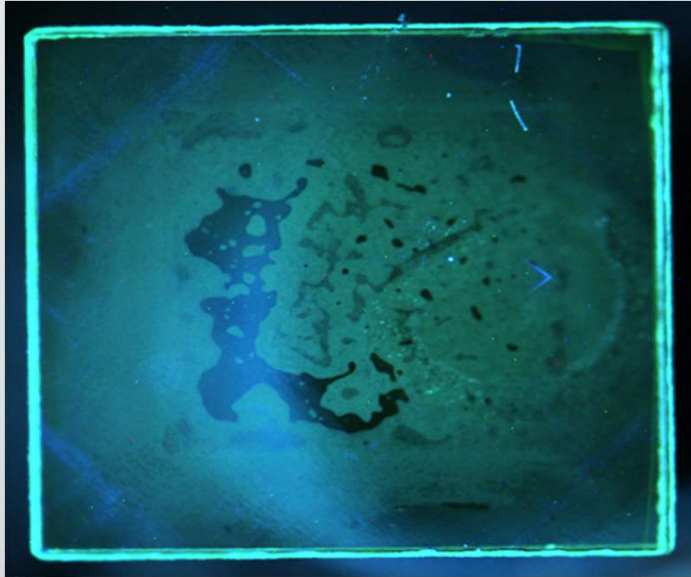
Fri 01 Oct '21
[URSS Public Engagement Initiative](#)

[NEWS >](#)

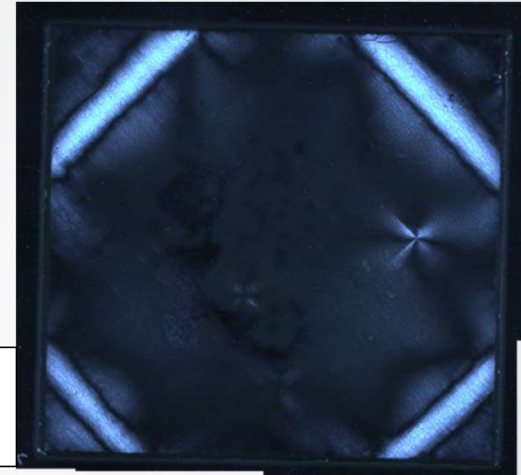
Ethan

- Title: Mapping Strain in CVD-Grown Diamond
- Supervisor(s): Ben Green

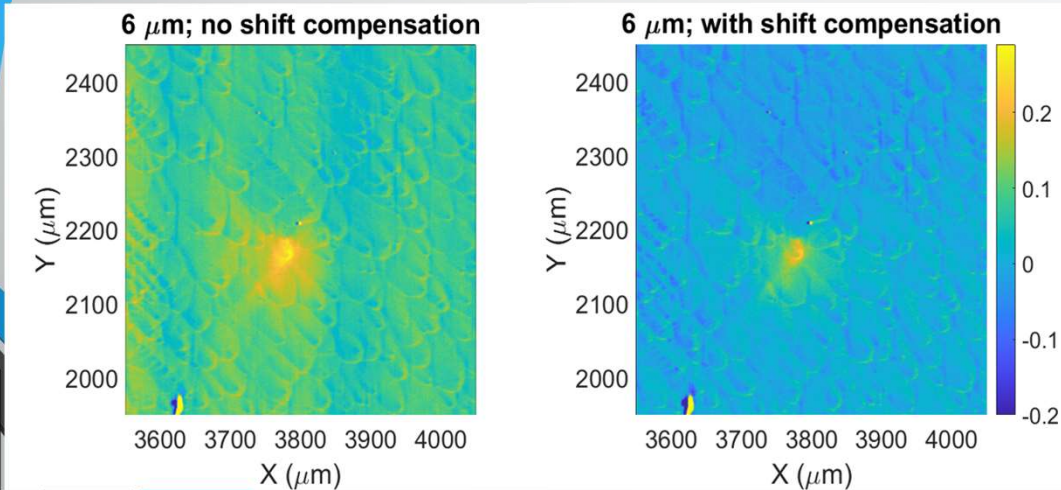




Diamondview
of sample

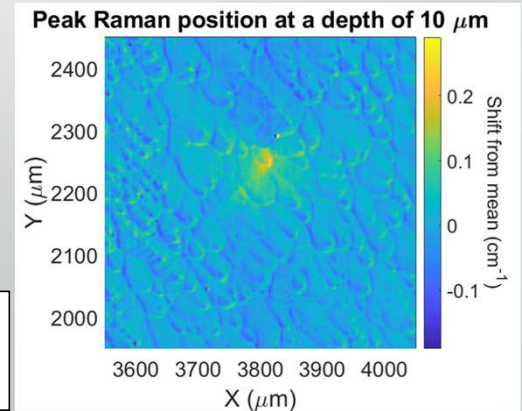


Birefringence
of sample



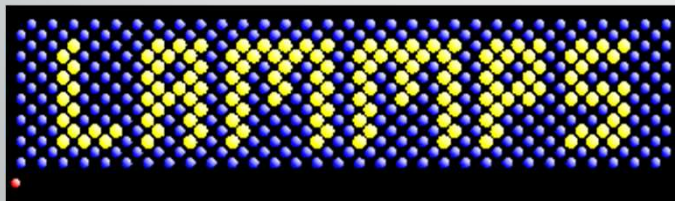
Comparison of
shift
compensation

Raman map
of defect



Chung

- Title: Moiré Phonons in Twisted Bilayers of Transition Metal Dichalcogenides
- Supervisor(s): Nick Hine, in collaboration with Dr Samuel Magorrian and Anas Siddiqui



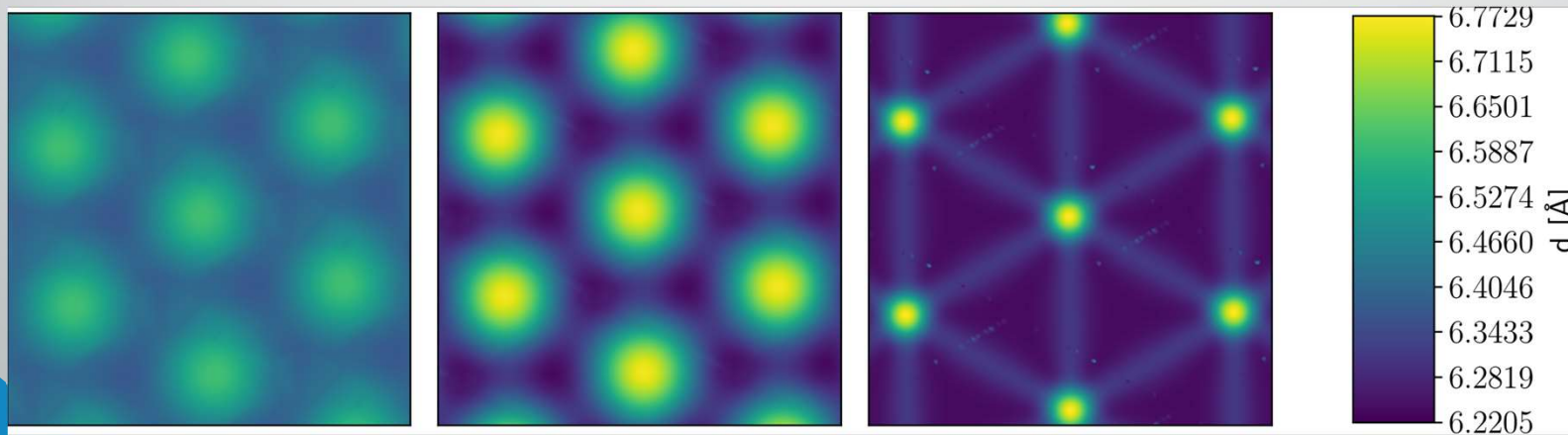
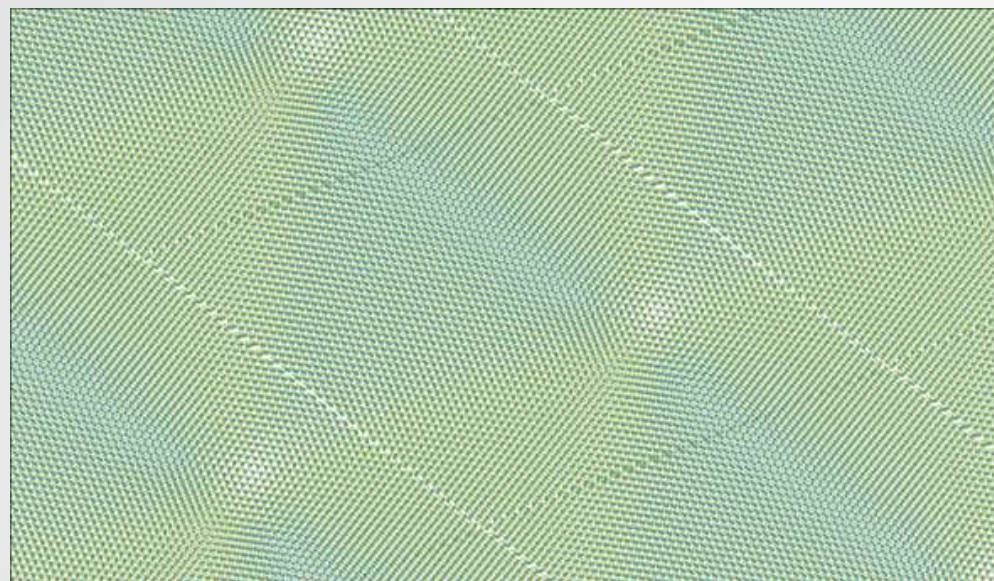
EPSRC CDT in Modelling of Heterogeneous Systems - HetSys

What is a TMD and what is a phonon

- Transition Metal, M commonly Molybdenum (Mo) or Tungsten (W)
- Chalcogen, X: commonly selenium, sulfur
- Transition Metal Dichalcogenide (TMD): MX_2
- Phonons are quantised particles of vibration (like how emitted photons from atoms are quantised)
- Any different mode of oscillation represents a phonon mode at a specific phonon frequency

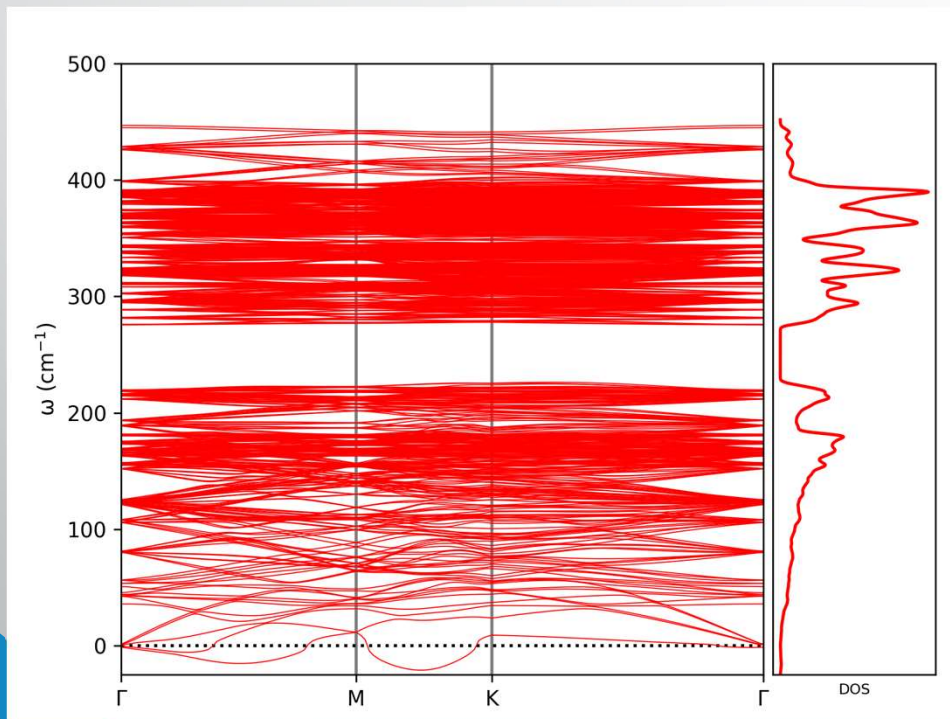
Outline of the project:

- Traditionally, calculation of minimisation energies and phonon modes are traditionally done with a computationally expensive set of calculations called density functional theory
- This solves the Schrödinger equation (and a bunch of other stuff) using the electron density functional as part of the wavefunction
- Newer methods use Machine-Learned Interatomic Potentials
- Implement this Machine-Learned Interatomic Potential into LAMMPS to relax the material. Relaxed material will have varying interlayer distance due to atoms settling in different potential wells



Outline of the Project

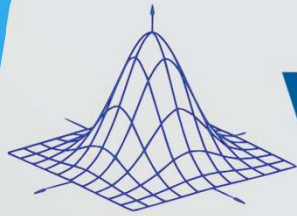
- Then perform Phonon /vibration mode analysis by calculating the second order force constant tensor. This is done under the hood
- We get phonon bandstructures



$$\Phi_{ij}^{\alpha\beta} = \frac{\partial^2 U}{\partial x_{i,\alpha} \partial x_{j,\beta}}$$

Conclusion

- Very fast, performed 17862 atom in 48 hours, DFT would take weeks.
- Predictions can be easily made



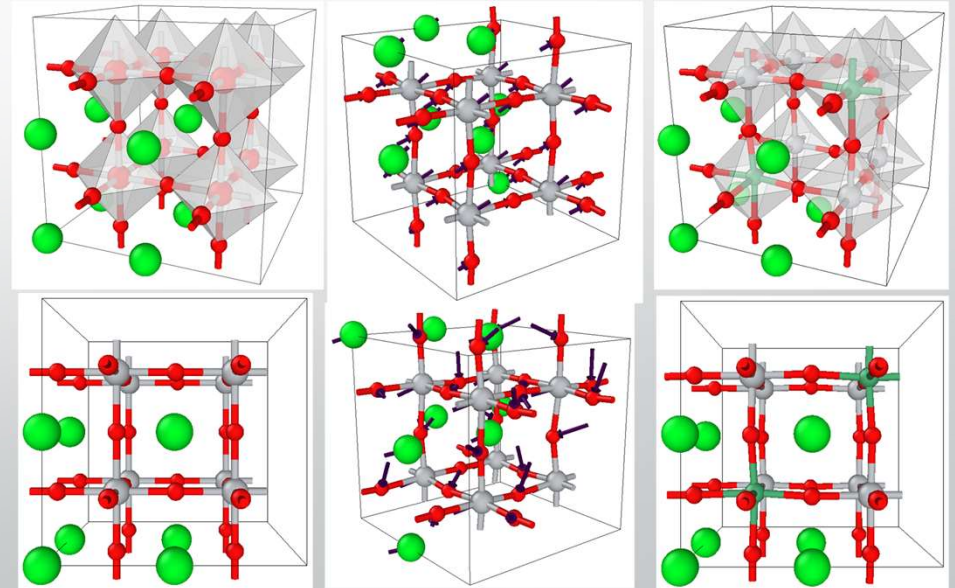
WCPM Mathys



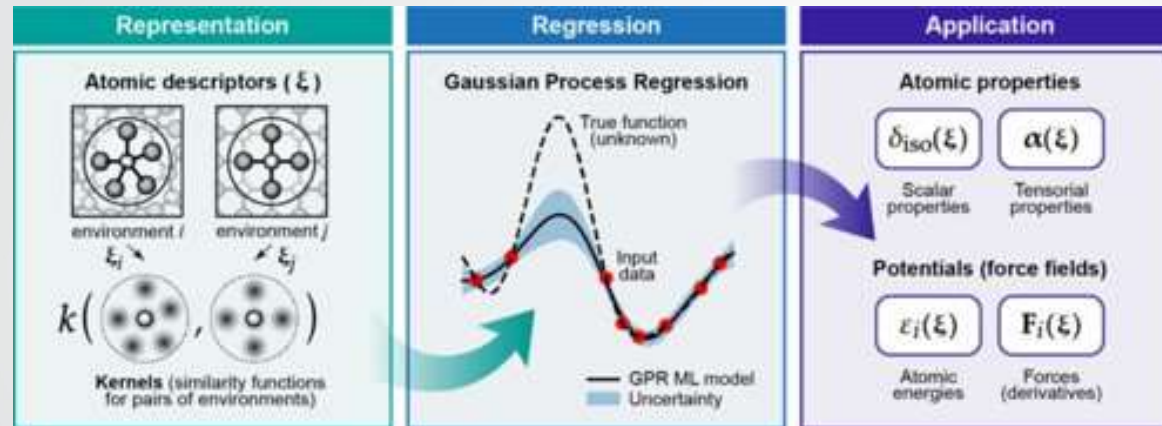
- Title: Computational Study of Niobium-Doped Strontium Titanate Perovskites
- Supervisor: Albert Bartók-Pártay



1. Condensed Matter --> (Maths/Phys/
Chem/Eng)
2. Computational Research (**WCPM**
+ **HetSys** + **Conferences...**)
3. Thermoelectrics
4. DFT modelling SrTiO_3 --> **CASTEP**
(octahedral tilting, defect migration...)



GAP-Machine Learning



Evaluating speedup time: 2000 iteration example from above

Time for GAP+DFT	15h 29m
Time for DFT only	37d 10h 10m

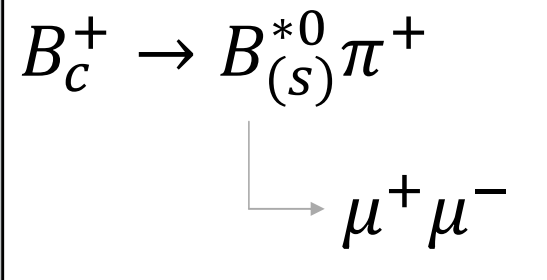
- DFT - SCF cycles
- GAP - ML

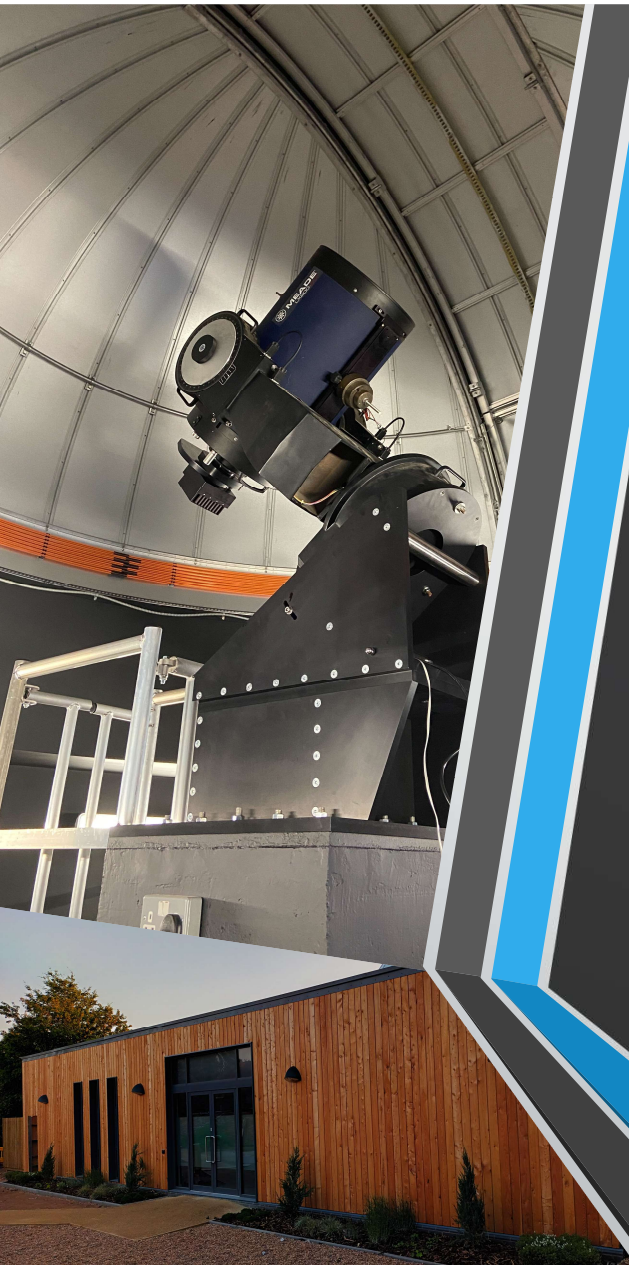


Time in SCF cycles	64.5%
Time in GAP	35.5%
Total Iterations	2000
AIMD iterations in same time	≈ 34
Speedup using ML	$\approx 58\times$

Sam

- Title: Exploring Excited B Mesons at the LHCb Experiment
- Supervisor(s): Fernando Abudinén and Tim Gershon



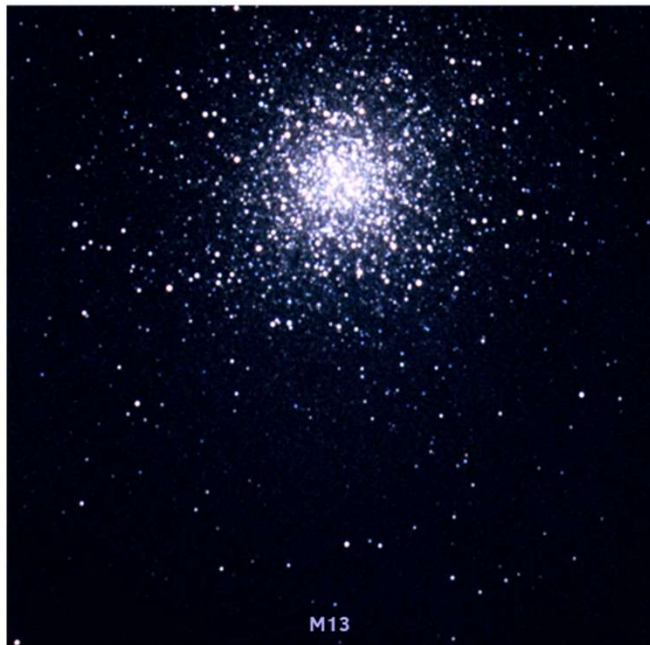
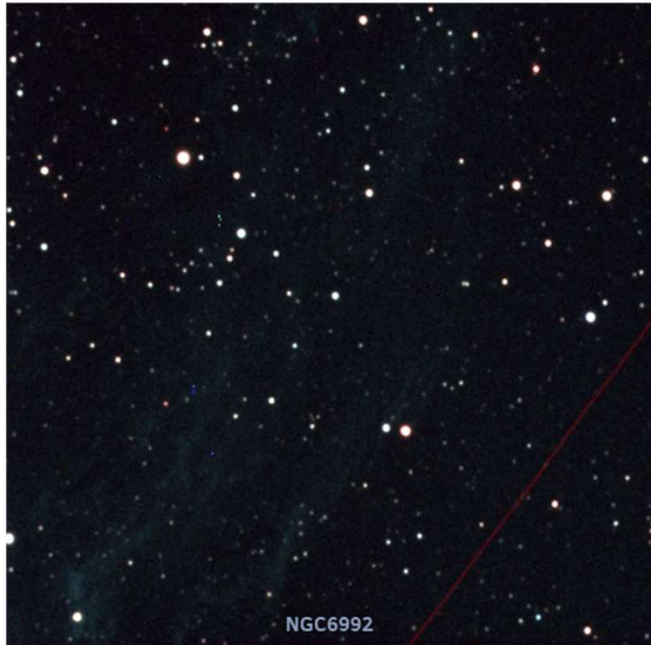


Davina

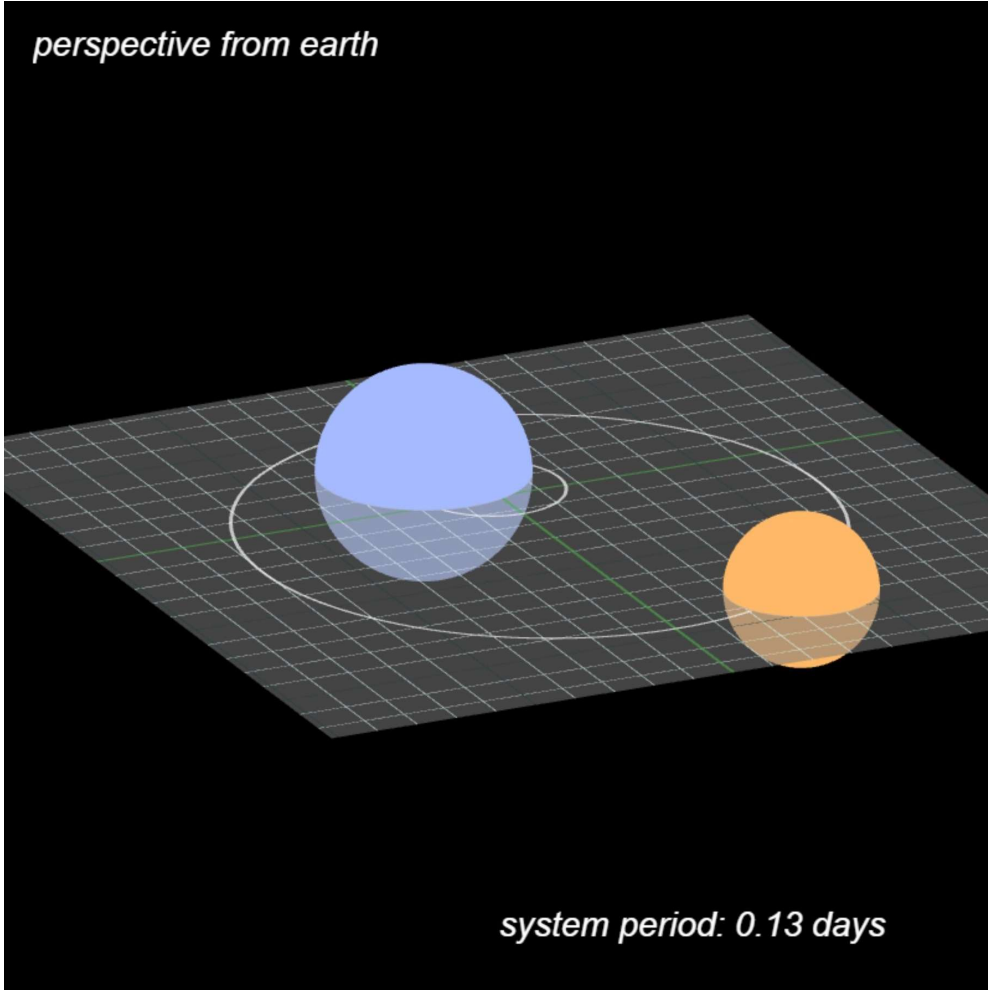
- Title: The Birth of Windmill Hill Observatory
- Supervisor(s): Daniel Bayliss (special thanks to James McCormac and Paul Chote)

Now known as The Marsh Observatory

- Image processing
- Eclipsing Binaries/transits
- Zero-point calibration
- Outreach

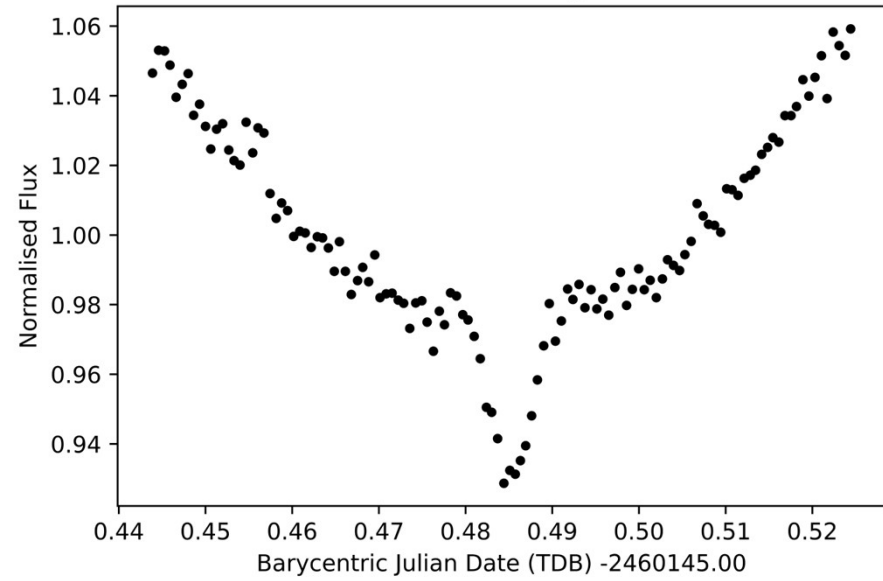


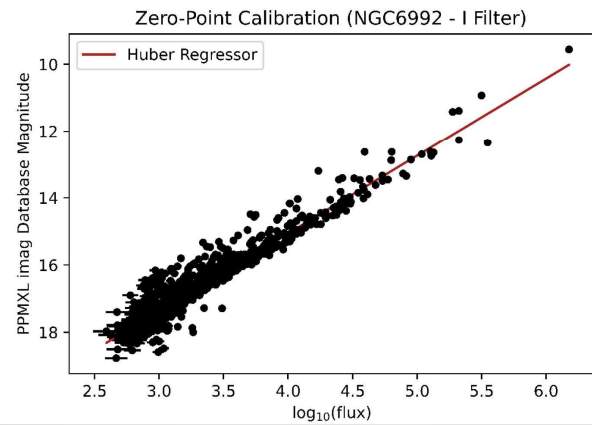
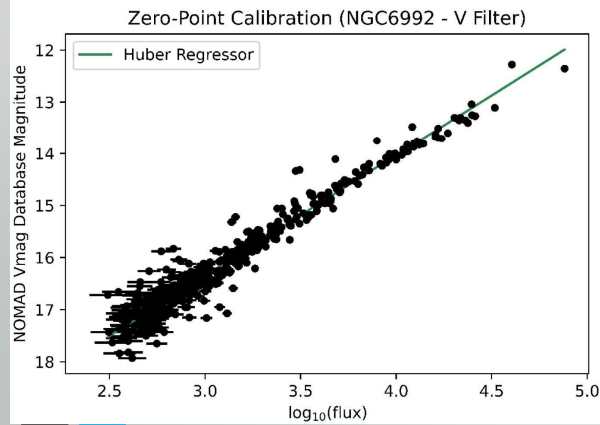
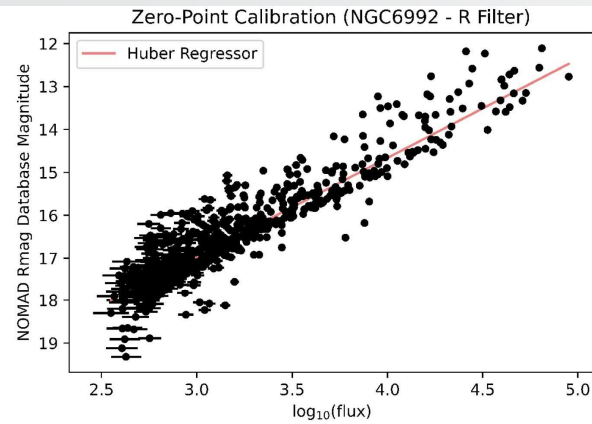
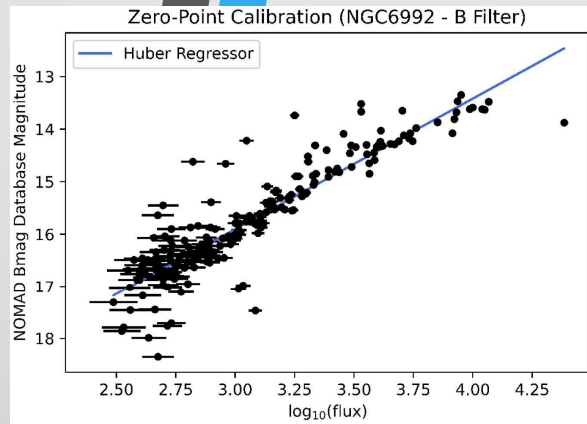
perspective from earth



system period: 0.13 days

KEPLER 9472174 Light Curve





$$m = -2.5 \log_{10} \left(\int_0^{\infty} F(\lambda) S d\lambda \right) + C$$

m is the apparent magnitude

$F(\lambda)$ flux as a function of wavelength

S is the sensitivity function ($S = \begin{cases} 1, & \text{inside colour band} \\ 0, & \text{outside colour band} \end{cases}$)

C is an unknown constant (the ZERO POINT)

FILTER	ZERO POINT	GRADIENT	STARS FOUND	OUTLIERS
<i>B</i>	23.36 ± 0.29	-2.48 ± 0.21	230	25
<i>V</i>	23.30 ± 0.17	-2.32 ± 0.06	473	12
<i>R</i>	23.87 ± 0.35	-2.30 ± 0.23	662	43
<i>I</i>	24.31 ± 0.24	-2.31 ± 0.12	899	30

