

Supernovae with Fink

the Fink Team

What are we currently doing?

What can we do to prepare for Rubin?

What can we do with ZTF data and have fun?

What are we doing currently?

LSST lik-ish simulations

ELAsTiCC challenge

Infrastructure

Siding Spring Robotic Network

ZTF data

TNS

Early SN Ia reported to TNS

ZTF + ANU 2.3m

Optimising training set for ML

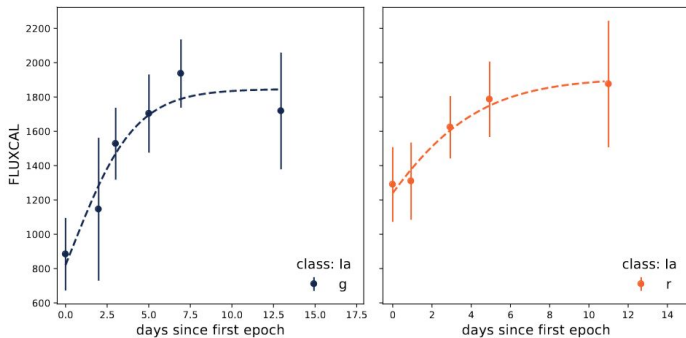
TNS/WiseREP

Fink follow-up group

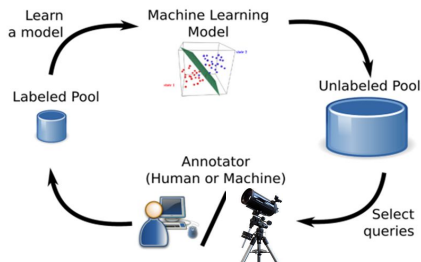


Early SN Ia Fink reported to TNS

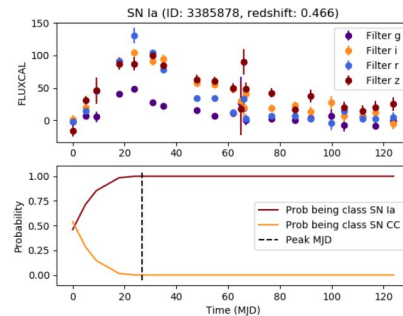
- Sigmoid features from *Leoni et al., 2022*



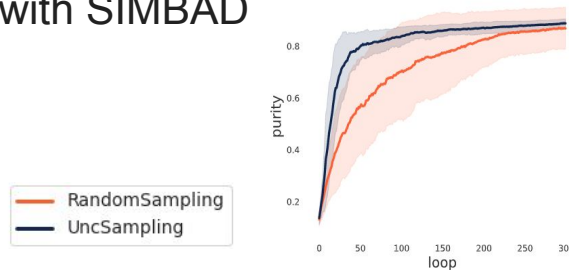
- Off-line train with Active Learning



- Agreement with SuperNNova



- Less than 20 detected points
- At least 3 points per filter
- Xmatch with SIMBAD



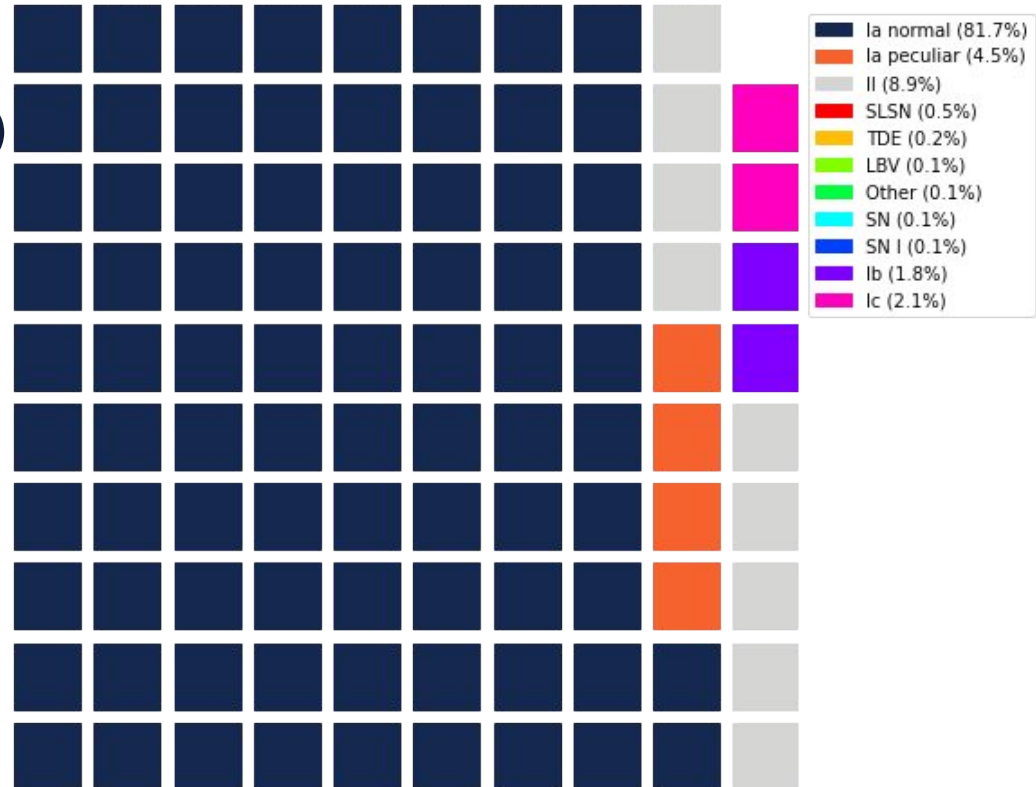
Early SN Ia Fink reported to TNS

Not a known transient/variable +
score(early SNIa & SNN SN | SNIa)

= 3017 reported to TNS
= 1632 followed-up

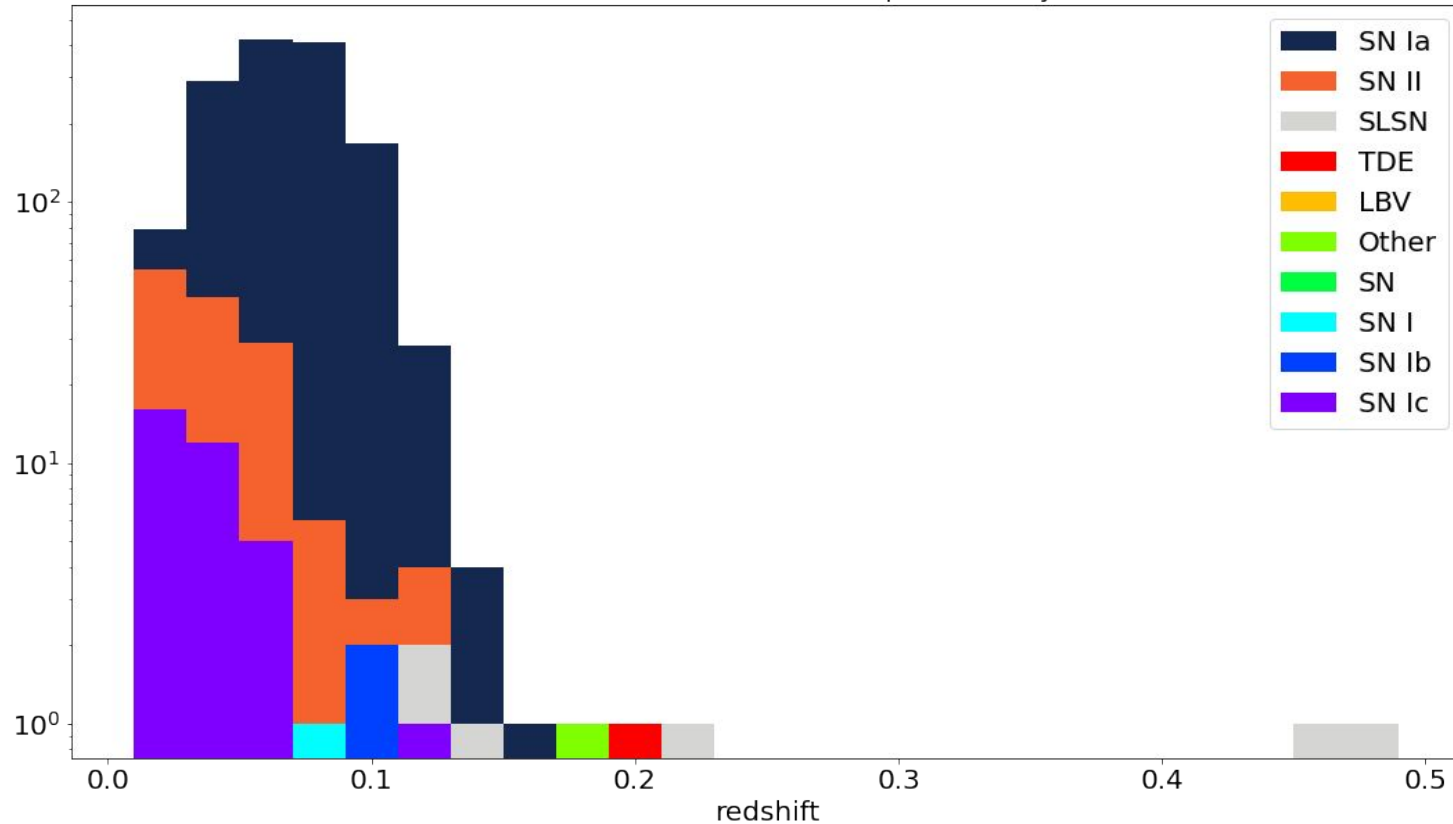
Marco, Emille, Julien, +++

Fink early SNIa TNS reported and followed-up spectroscopically



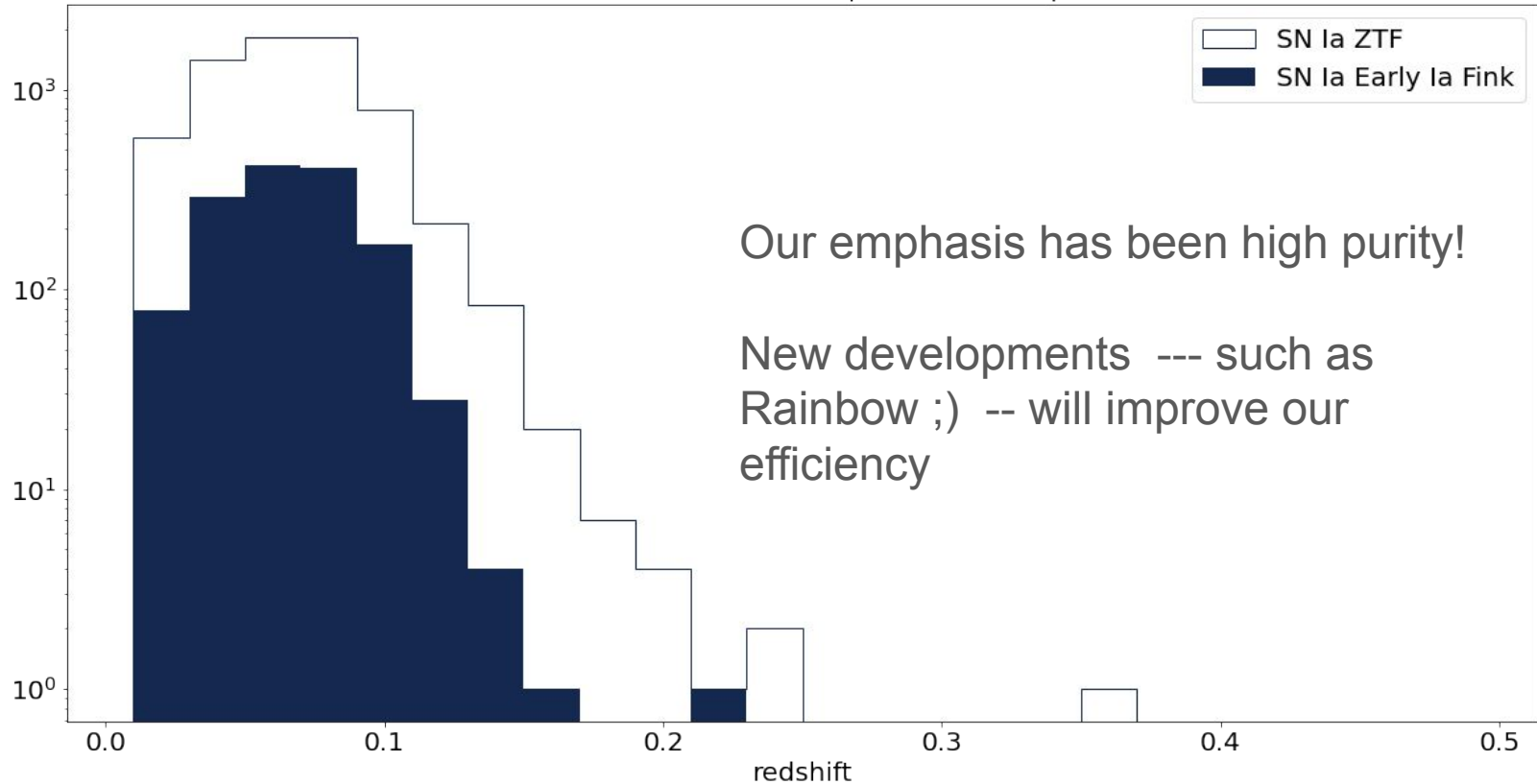
Early SN Ia Fink reported to TNS

Redshift distribution of Fink TNS reported early SNIa



Early SN Ia Fink reported to TNS

Redshift distribution of ZTF spec and Fink reported



Our emphasis has been high purity!

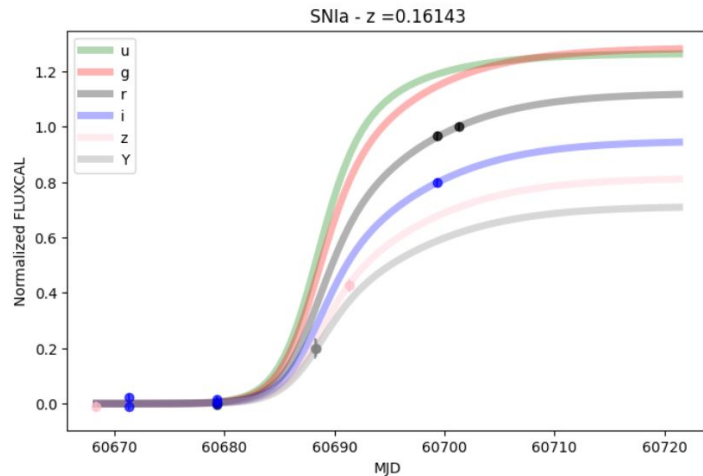
New developments --- such as Rainbow ;) -- will improve our efficiency



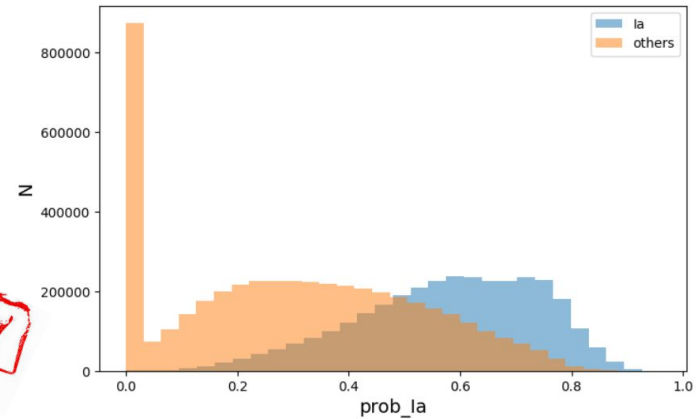
ELAsTiCC challenge

- Cadence is far from ideal
- We needed to be able to extract features with a lower number of points

Example of light curve fitted with sigmoid + rainbow



PRELIMINARY



Threshold	Efficiency	Purity
0.5	0.70	0.70
0.6	0.49	0.77
0.7	0.26	0.85
0.8		



Siding Spring Observatory Robotic Telescope Network

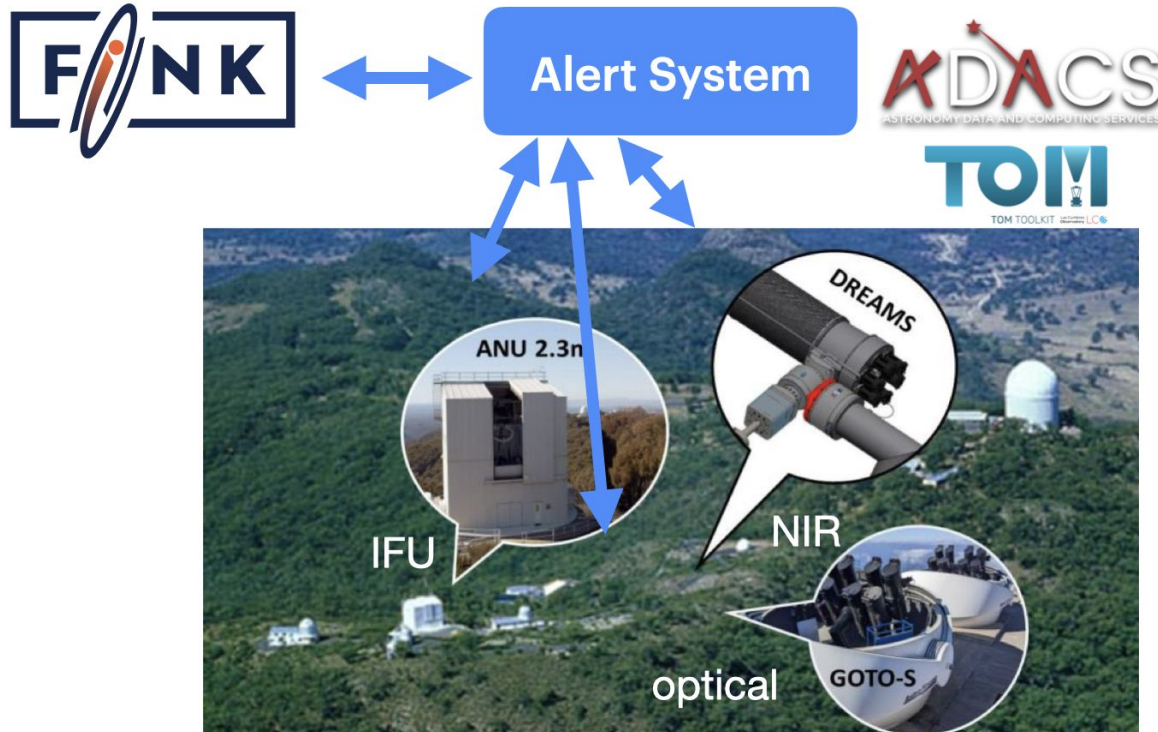
Australia is in a unique geographical position

Optical
Radio
IR
... and more



Siding Spring Observatory Robotic Telescope Network

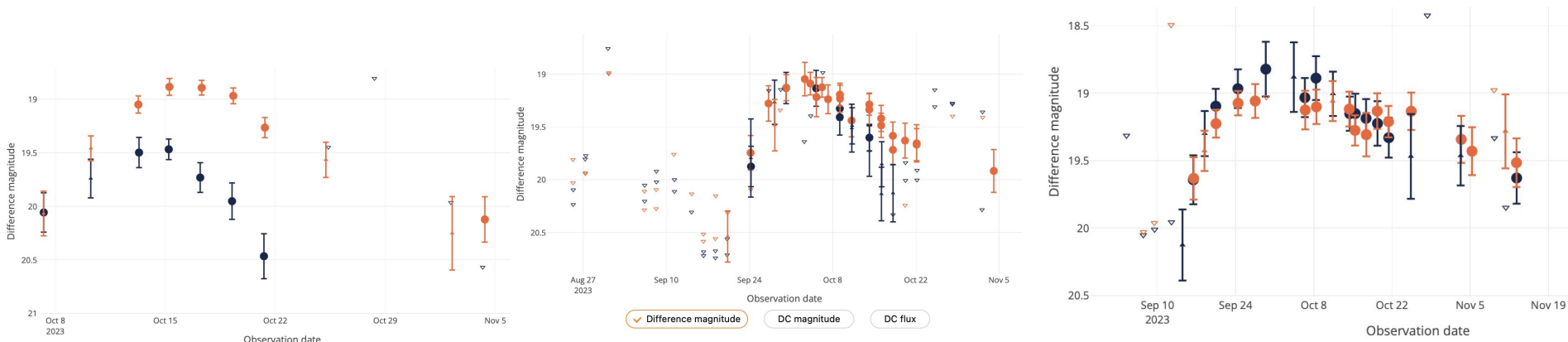
ARC LIEF grant: Software engineers for an Alert System + automatic data reduction



AL: improving training sets

Aka: follow-up to identify early non conclusive SNe Ia or non Ia

2 CV, 16 SN Ia, 1 SN Ib, 2 SN Ibn, 1 SN Ic, 5 SN II, and others low SNR



ANU 2.3m IFU for spectroscopic follow-up + extra spectra by DEBASS and ePESSTO+

Working towards a publication later this year

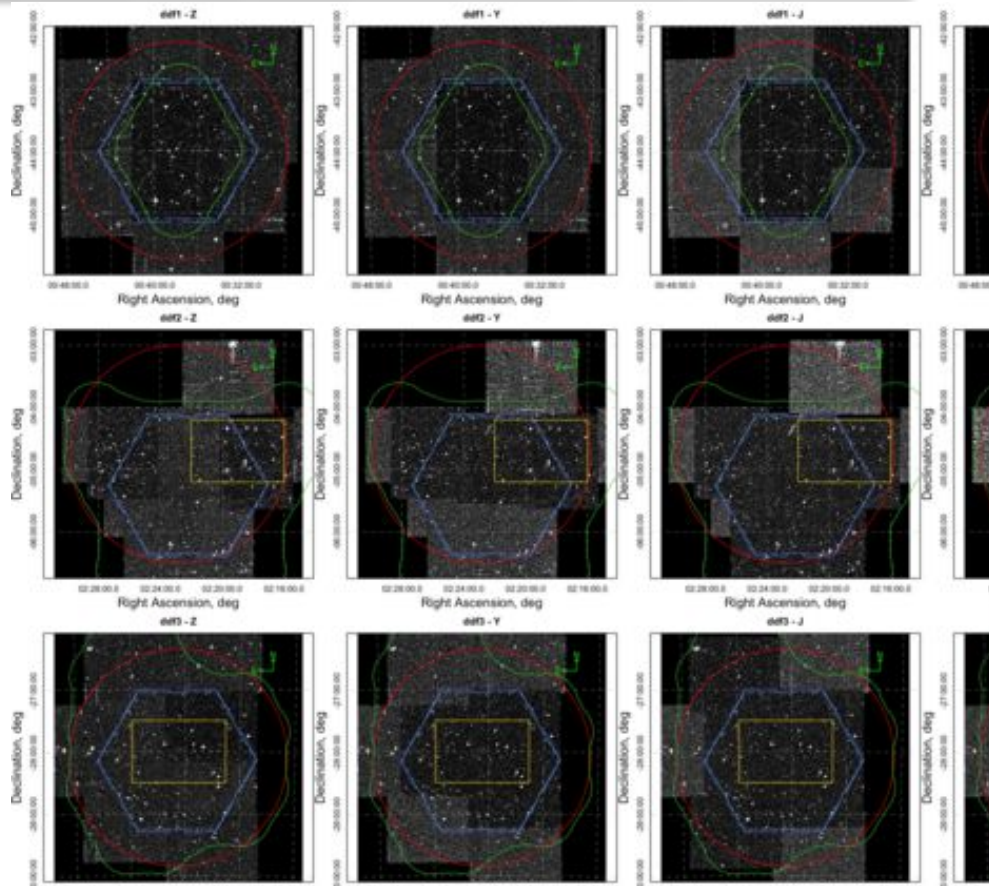


What can we do for Rubin?

- Robotic network for follow-up of interesting SNe
- Connecting to 4MOST TiDES
- Creating new follow-up programmes to fill gaps in TiDES for science we are keen for:
 - Siding Spring Obs. (AAT)?

....

Yellow = DEVILS
Red = LSST DDFs
Green = HI data



Some ideas with ZTF data...

ZTF has the statistics for population, environment studies

Not all SNe at ZTF gets followed-up and spectroscopically classified...

Searching for early SNe Ia with shock interactions?

SN Ia / SNIbc degeneracies

Finding rare subtypes: Ca-rich, 91bgs

Other types: SLSNe, intermediate SNe

Finding the elusive PISNe

Combining ZTF data with multi-wavelength data

... there are many things to do ;)



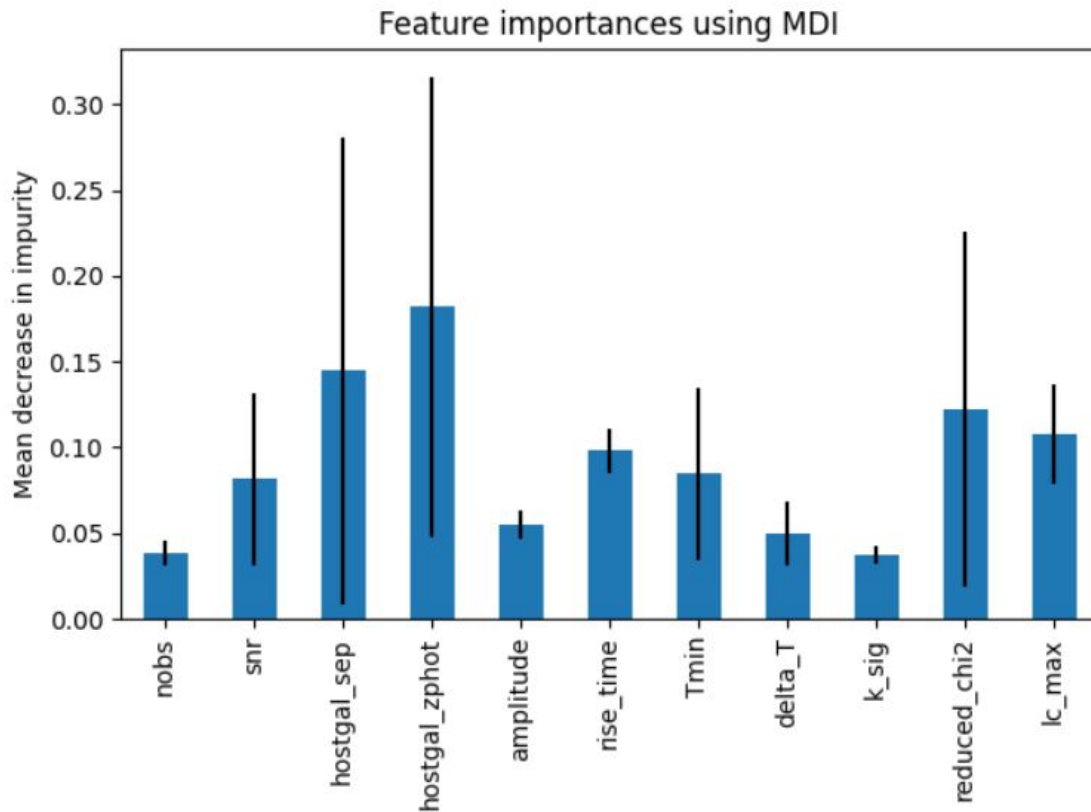








Rainbow feature importance - ELAsTiCC



PRELIMINARY

