

This document contains the model plots and the time budget calculations for the **3-filter strategies** for the LSST ToO program, as discussed in the Europe+Asia+Africa discussion calls during the workshop.

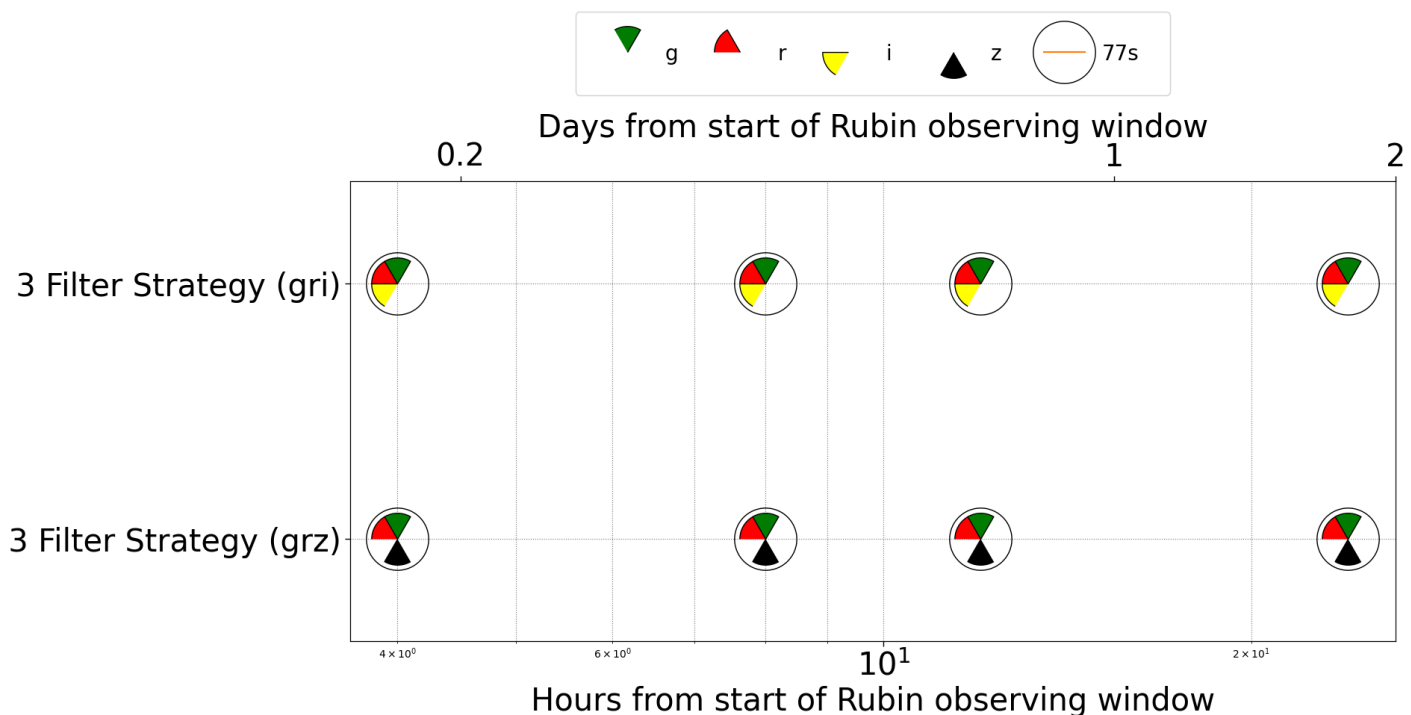
Considered combinations - gri, grz

Epochs - 3 visits on a single night, followed by two epochs after $t_0 + 1$ day

Science Case considered - BNS

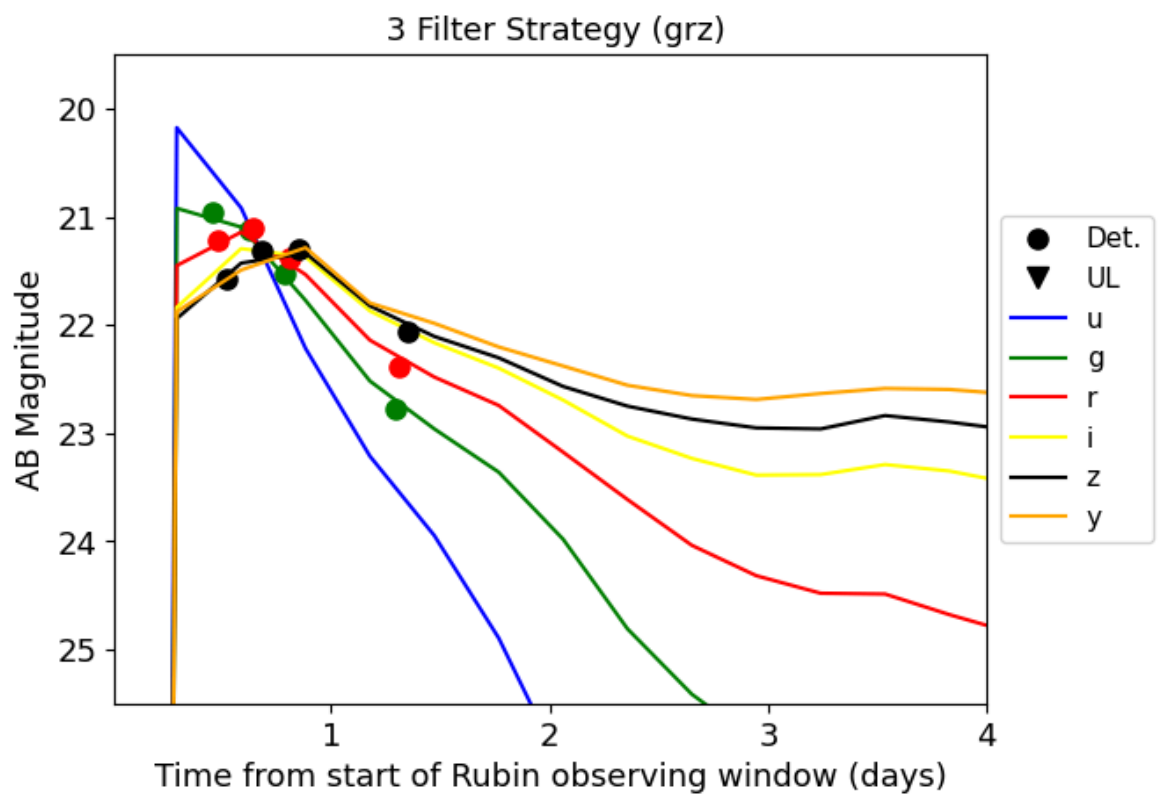
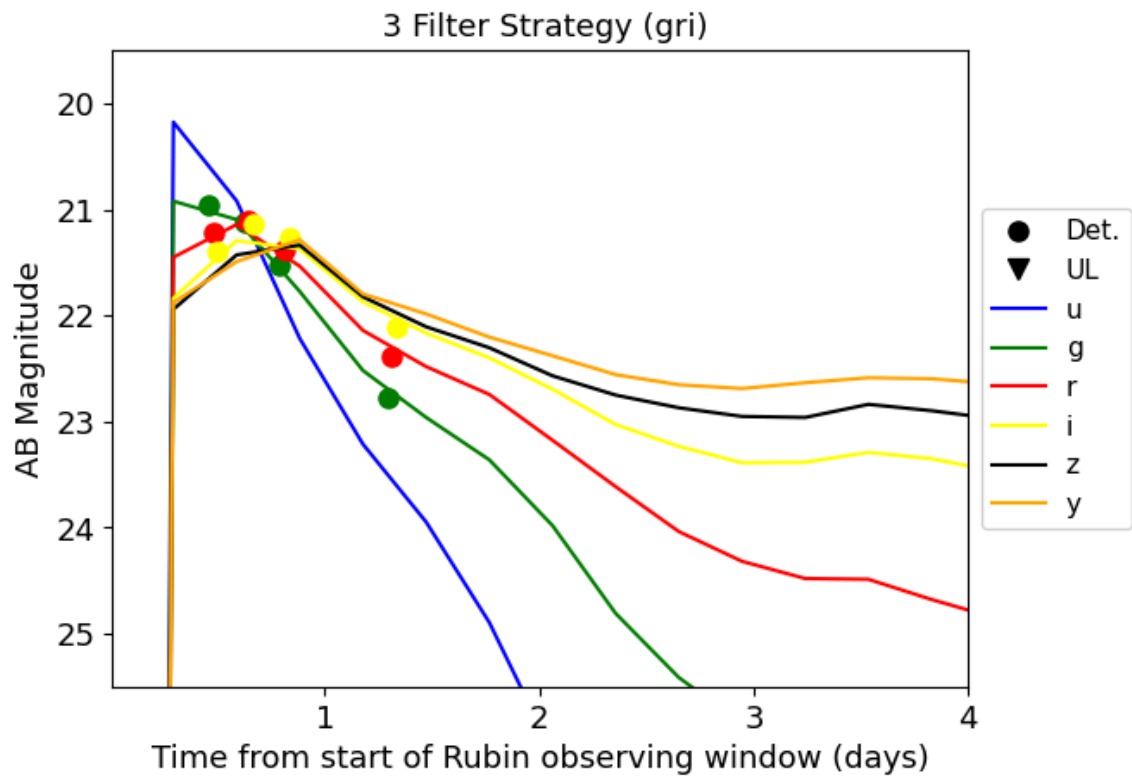
Depths are fixed to 25.0 for all filters, and corresponding exposure times (and hence the final time requirements) are calculated by the code here:

https://github.com/igorandreoni/RubinToO2024/blob/main/plots_RubinToO2024.ipynb



Model plots at 400 Mpc (files for 350 Mpc to be added to Github yet). Model choice: GW170817 best fit polar viewing angle, $\theta=26$ degrees; taken from <https://arxiv.org/pdf/2307.09511>:

(Next Page)



Time budget calculations for each strategy:

Strategy name: 3 Filter Strategy (gri):

	Epoch = 4 hr	Epoch = 8 hr	Epoch = 12 hr	Epoch = 24 hr
exposure times	267s	267s	267s	267s
overhead change filter	360s	360s	360s	360s
overhead between exposures	14s	14s	14s	14s
			Total exposure time per pointing	0.3hr
			Total time for 4 fields	1.36hr
			Total time for 4 fields and 5 events	6.79hr

Strategy name: 3 Filter Strategy (grz):

	Epoch = 4 hr	Epoch = 8 hr	Epoch = 12 hr	Epoch = 24 hr
exposure times	550s	550s	550s	550s
overhead change filter	360s	360s	360s	360s
overhead between exposures	14s	14s	14s	14s
			Total exposure time per pointing	0.61hr
			Total time for 4 fields	2.61hr
			Total time for 4 fields and 5 events	13.07hr

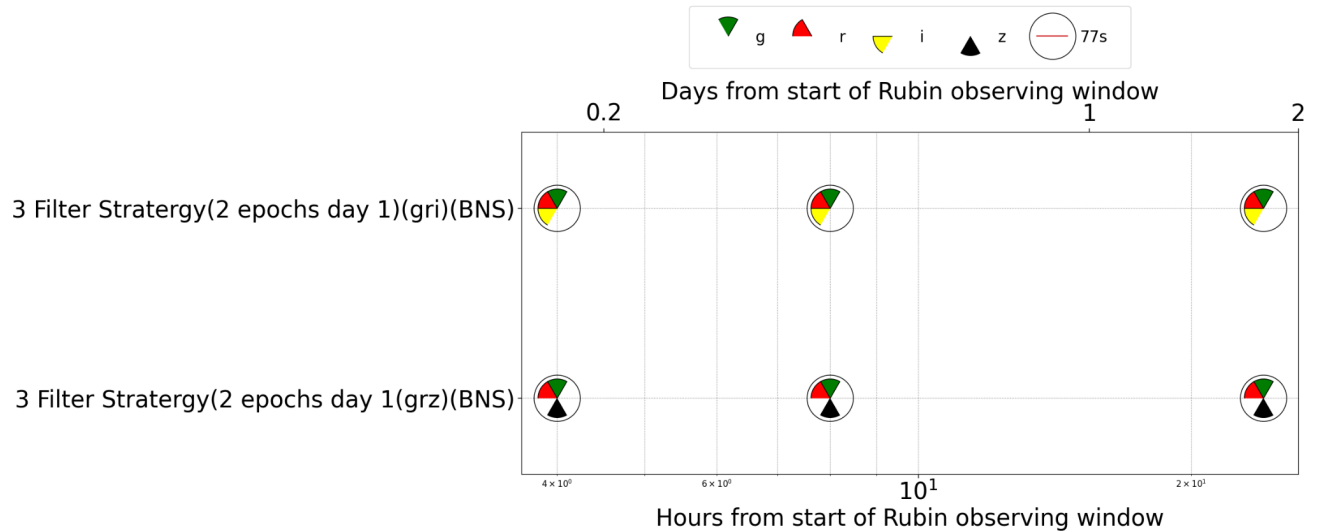
Considered combinations - gri,grz,

Epochs - 2 visits on a single night, followed by one epoch after $t_0 + 1$ day.

Science Case considered - BNS

Depths are fixed to 25.0 for all filters, and corresponding exposure times (and hence the final time requirements) are calculated by the code here:

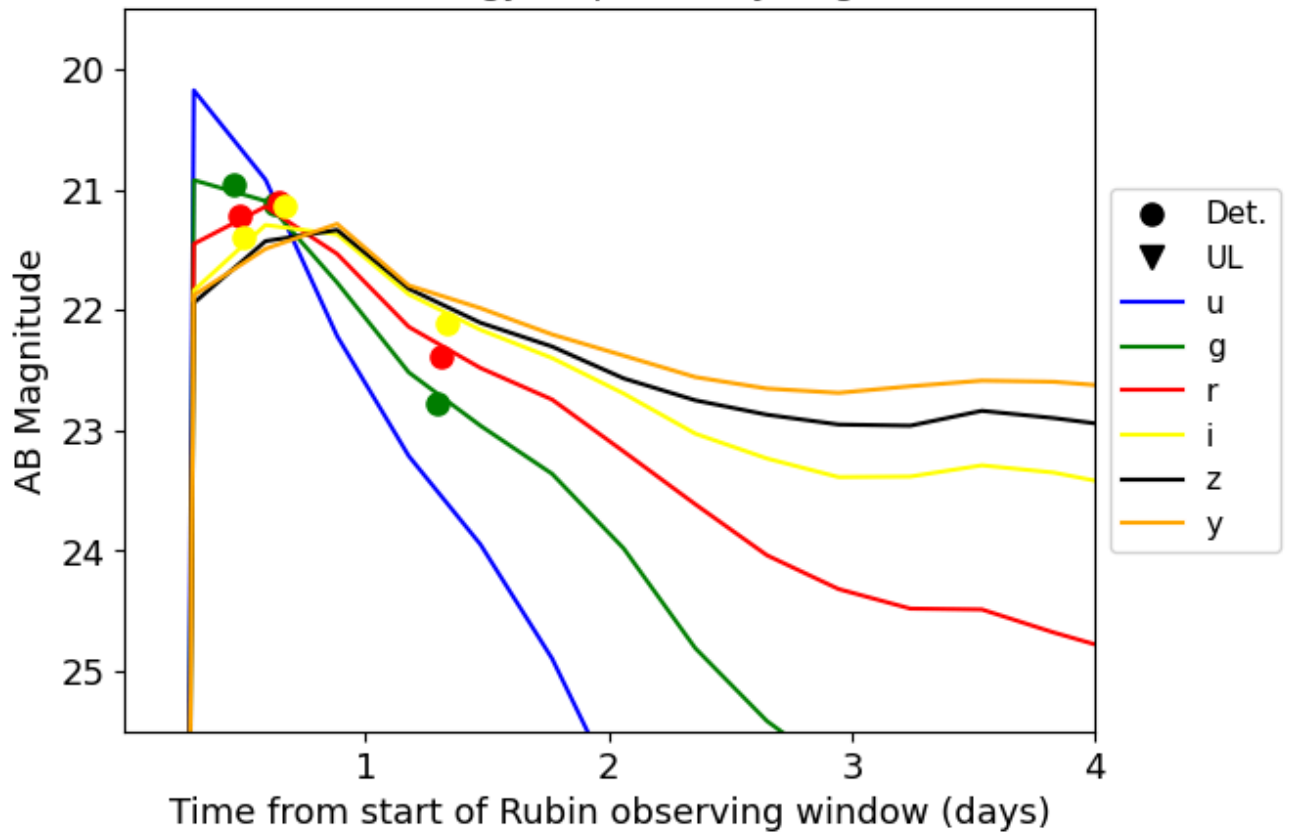
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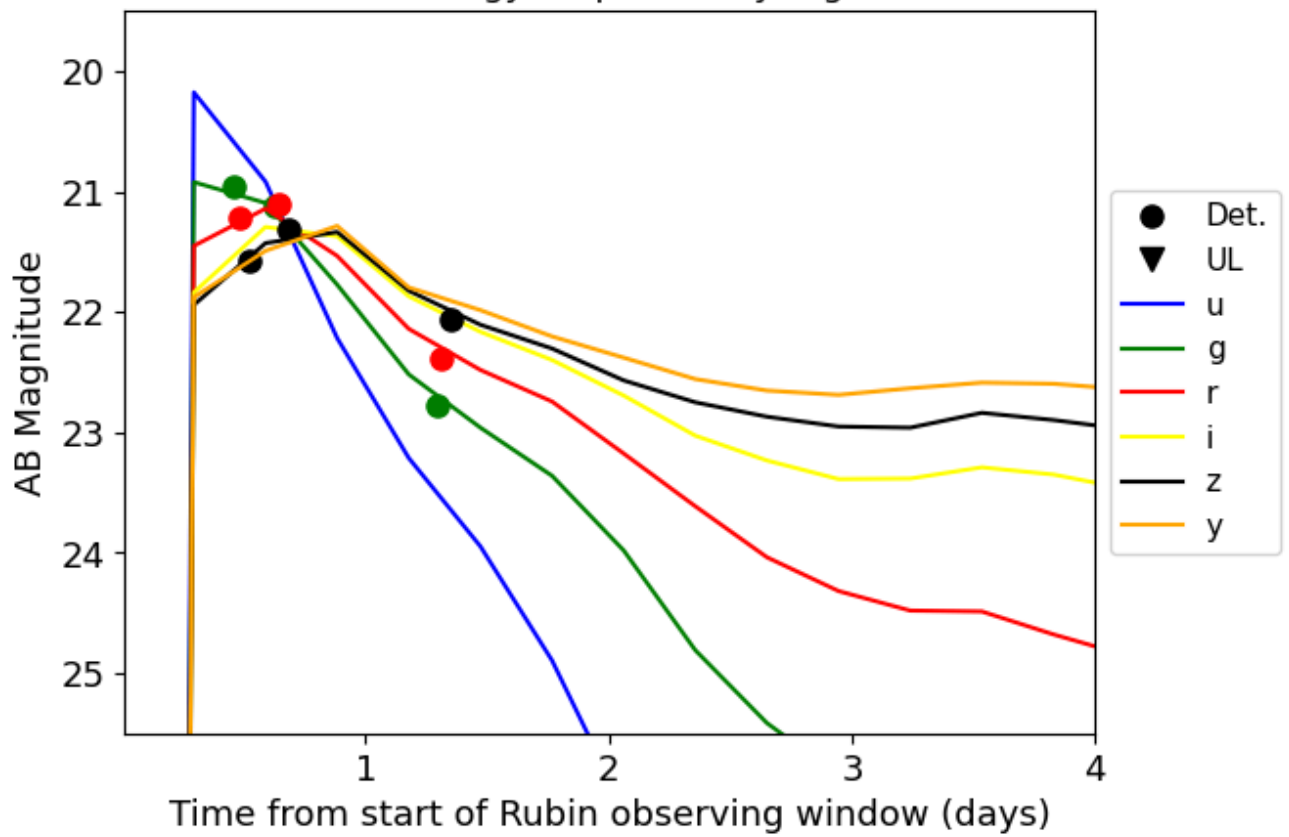
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(Next Page)

3 Filter Strategy(2 epochs day 1)(gri)(BNS)



3 Filter Strategy(2 epochs day 1)(grz)(BNS)



Time budget calculations for each strategy:

Strategy name: 3 Filter Strategy (2 epochs day 1) (gri):

	Epoch = 4 hr	Epoch = 8 hr	Epoch = 24 hr
exposure times	267s	267s	267s
overhead change filter	360s	360s	360s
overhead between exposures	14s	14s	14s
		Total exposure time per pointing	0.22hr
		Total time for 4 fields	1.02hr
		Total time for 4 fields and 5 events	5.09hr

Strategy name: 3 Filter Strategy (2 epochs day 1) (grz):

	Epoch = 4 hr	Epoch = 8 hr	Epoch = 24 hr
exposure times	550s	550s	550s
overhead change filter	360s	360s	360s
overhead between exposures	14s	14s	14s
		Total exposure time per pointing	0.46hr
		Total time for 4 fields	1.96hr
		Total time for 4 fields and 5 events	9.81hr

(Next Page)

Considered combinations - gru

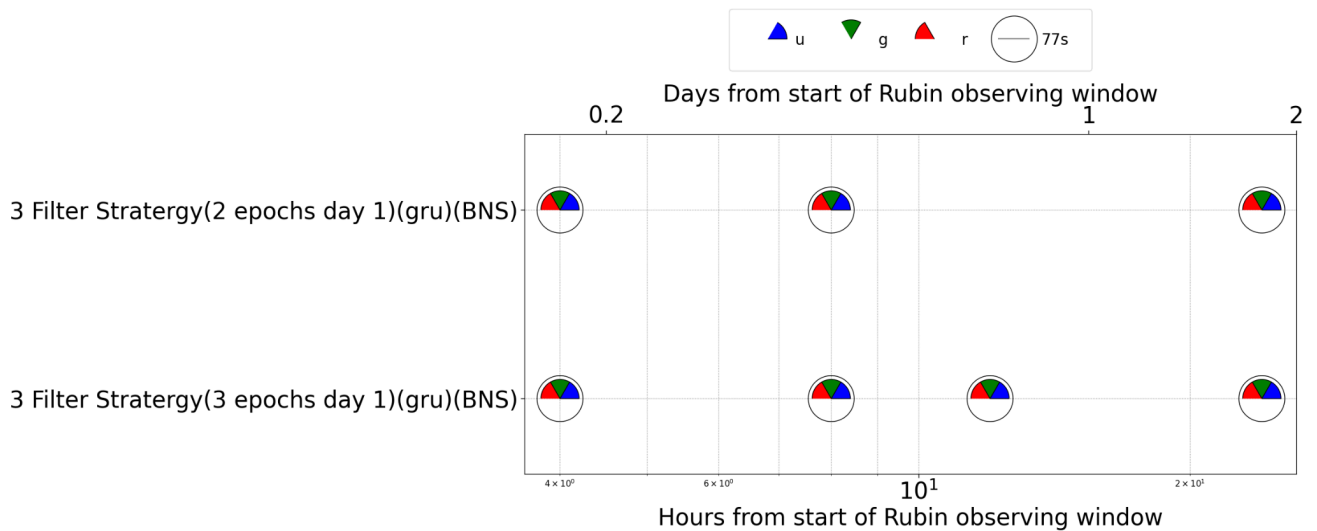
Epochs - Case 1: 2 visits on a single night, followed by one epoch after $t_0 + 1$ day

Case 2: 3 visits on a single night, followed by one epoch after $t_0 + 1$ day.

Science Case considered - BNS

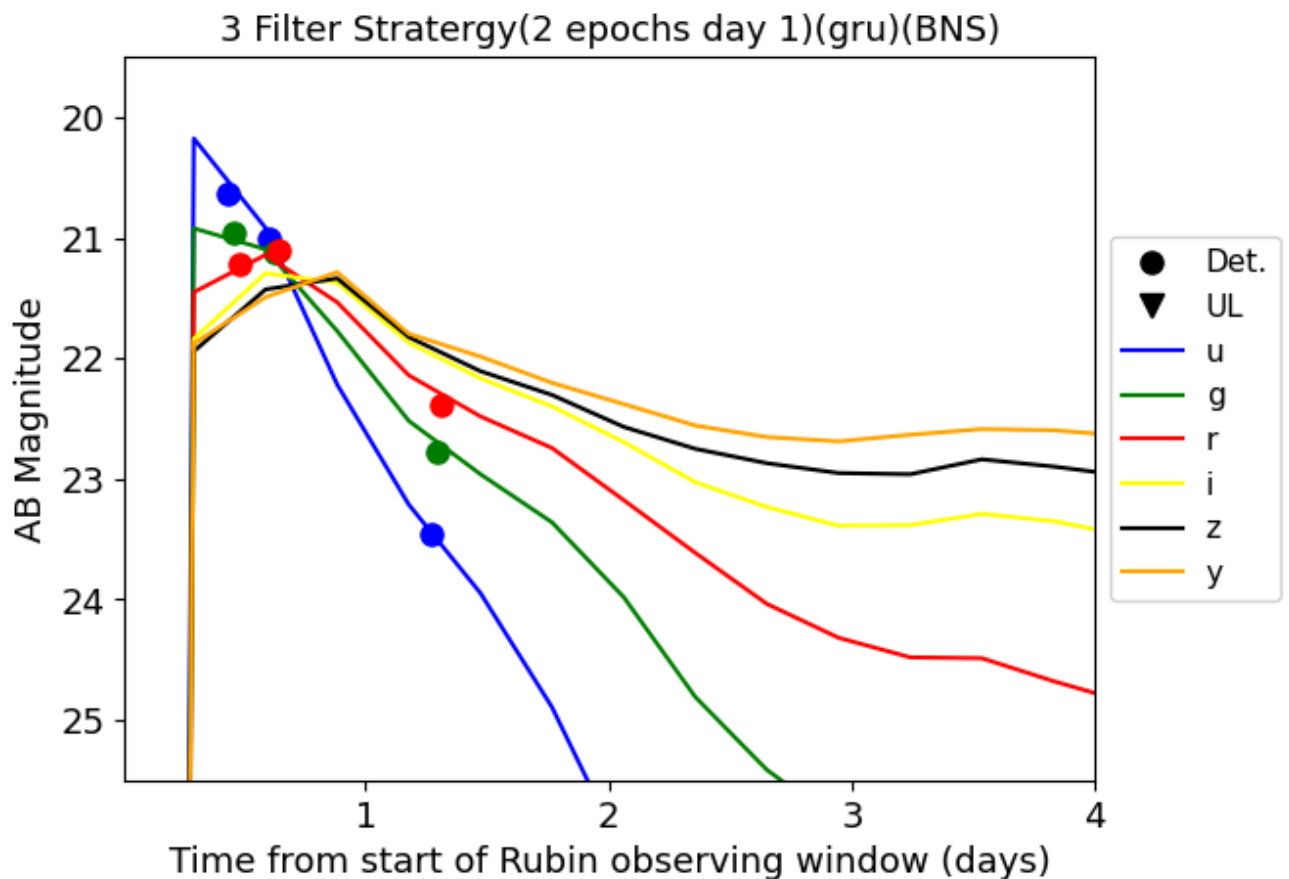
Depths are fixed to 25.0 for all filters, and corresponding exposure times (and hence the final time requirements) are calculated by the code here:

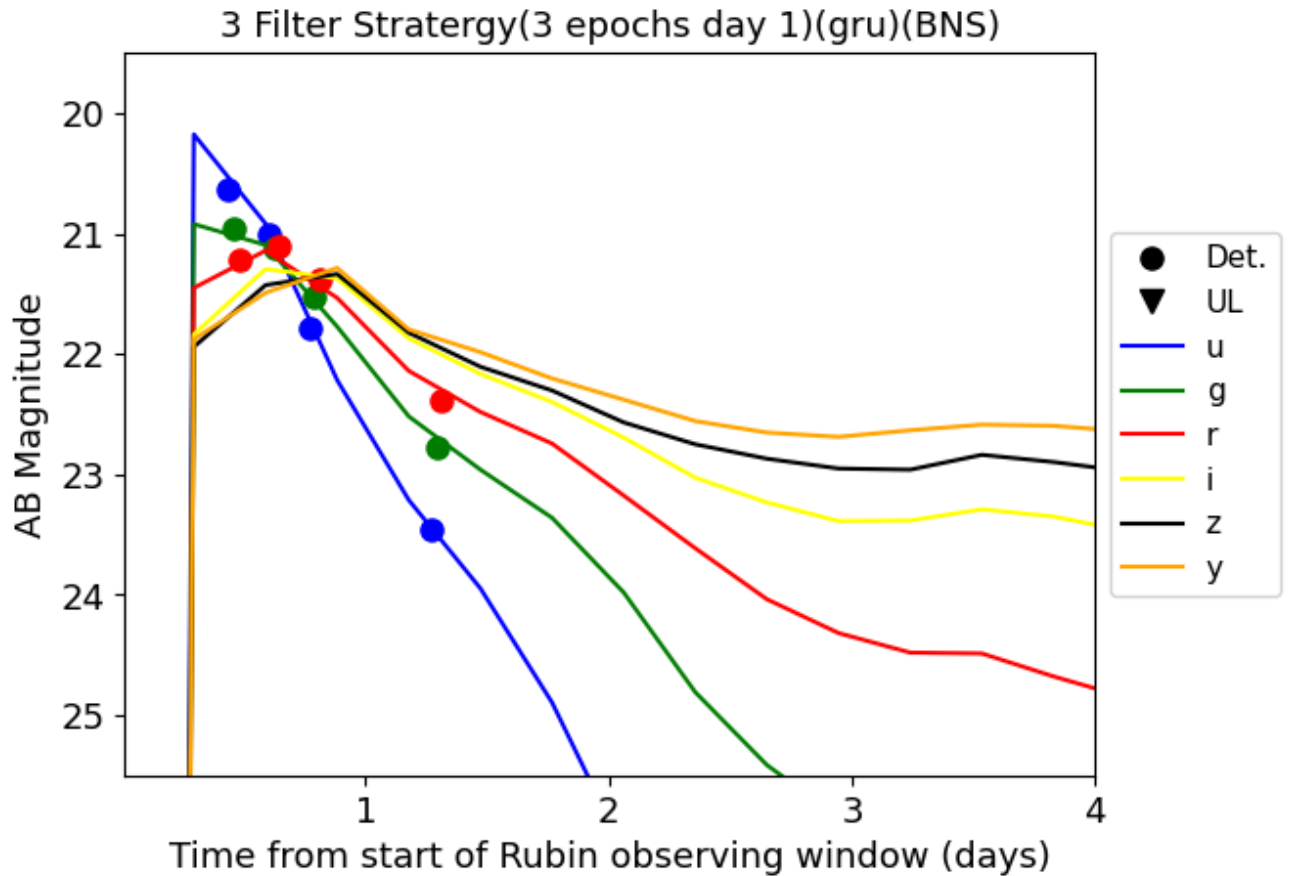
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Model plots at 400 Mpc (files for 350 Mpc to be added to Github yet). Model choice: GW170817
best fit polar viewing angle, $\theta=26$ degrees; taken from <https://arxiv.org/pdf/2307.09511>:

(Next Page)





Time budget calculations for each strategy:

Strategy name: 3 Filter Strategy (gru):

	Epoch = 4 hr	Epoch = 8 hr	Epoch = 24 hr
exposure times	503s	503s	503s
overhead change filter	360s	360s	360s
overhead between exposures	14s	14s	14s
		Total exposure time per pointing	0.42hr
		Total time for 4 fields	1.80hr
		Total time for 4 fields and 5 events	9.02hr

Strategy name: 3 Filter Strategy (gru):

	Epoch = 4 hr	Epoch = 8 hr	Epoch = 12 hr	Epoch = 24 hr
exposure times	503s	503s	503s	503s
overhead change filter	360s	360s	360s	360s
overhead between exposures	14s	14s	14s	14s
			Total exposure time per pointing	0.56hr
			Total time for 4 fields	2.41hr
			Total time for 4 fields and 5 events	12.03hr