

eSTAR

An Agent-based Predictive Engine for Variable Star Observing

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The problem

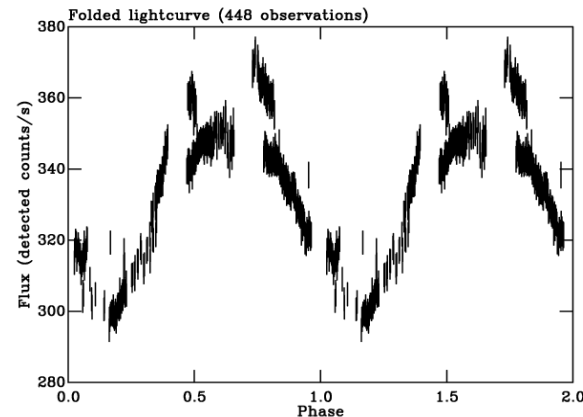
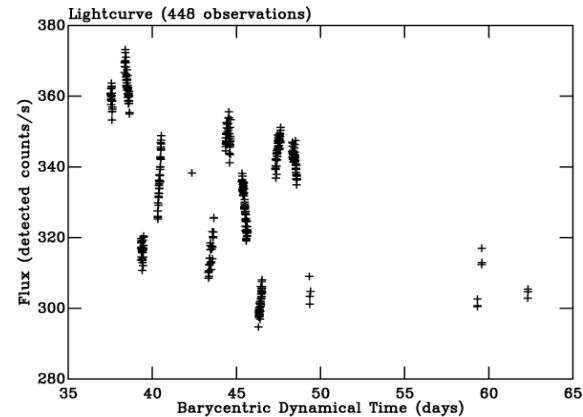
- Traditional variable star observing
 - Inefficient -> expensive
 - Strongly time constrained
 - Aliasing problems often dominate results
- An ab initio model
 - Can we find the ideal observing pattern for a given period range?
 - If we have half the data, when should we observe?

Why agents?

- eSTAR uses collaborative agent experts
 - Mobile in time
 - Multi-latitude observers
 - Access to many sources of data
 - Robust, scalable architecture
- A time series expert
 - Responsive to obstacles

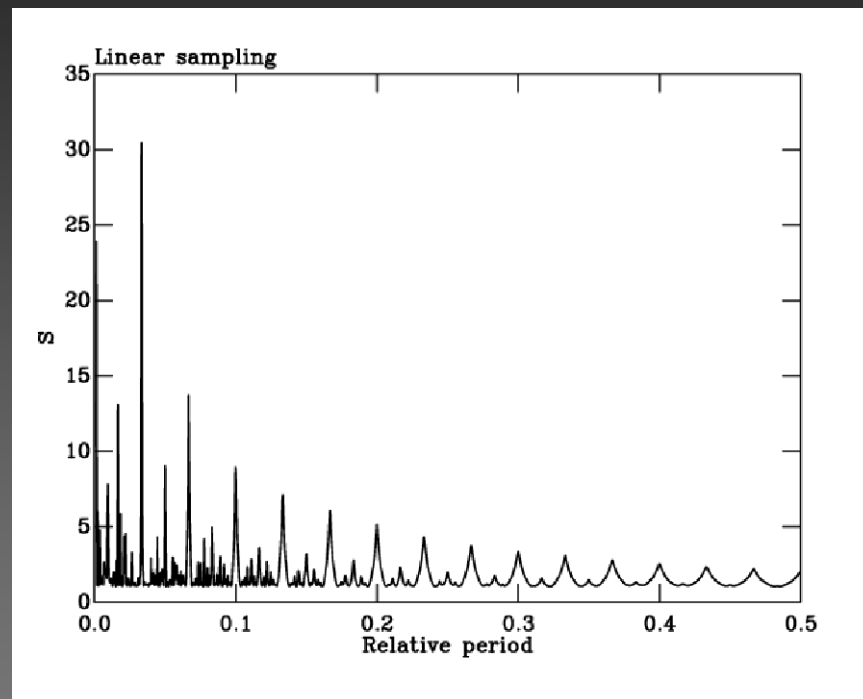
Is there a 'best' way to observe variables?

- Can we identify mathematically the key features of successful V.S. lightcurves?
- Can we provide this information to an agent?



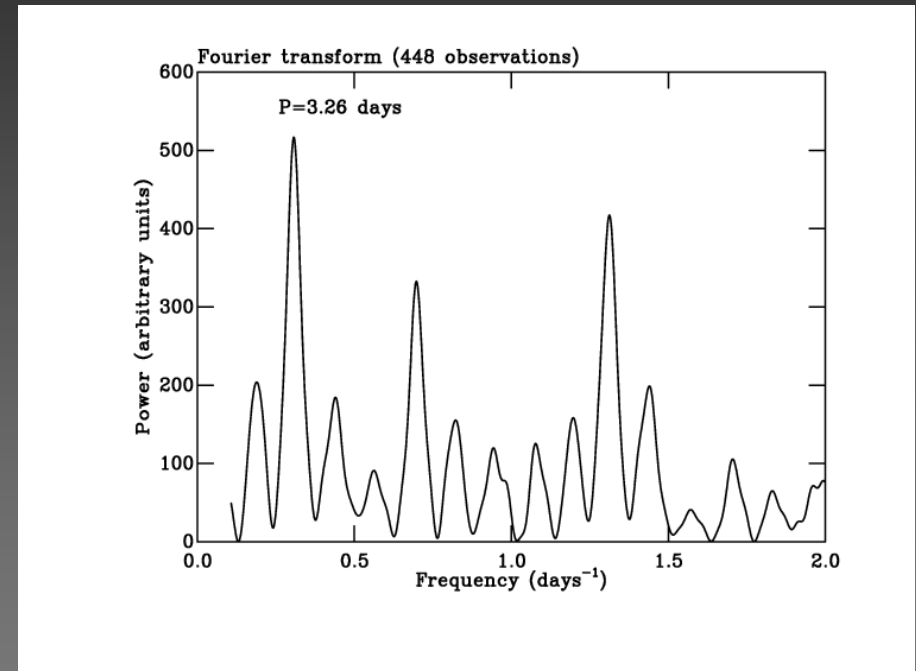
Phase coverage: S

- Expresses how well we have sampled across the lightcurve
- Need good coverage to rule out alternative periods



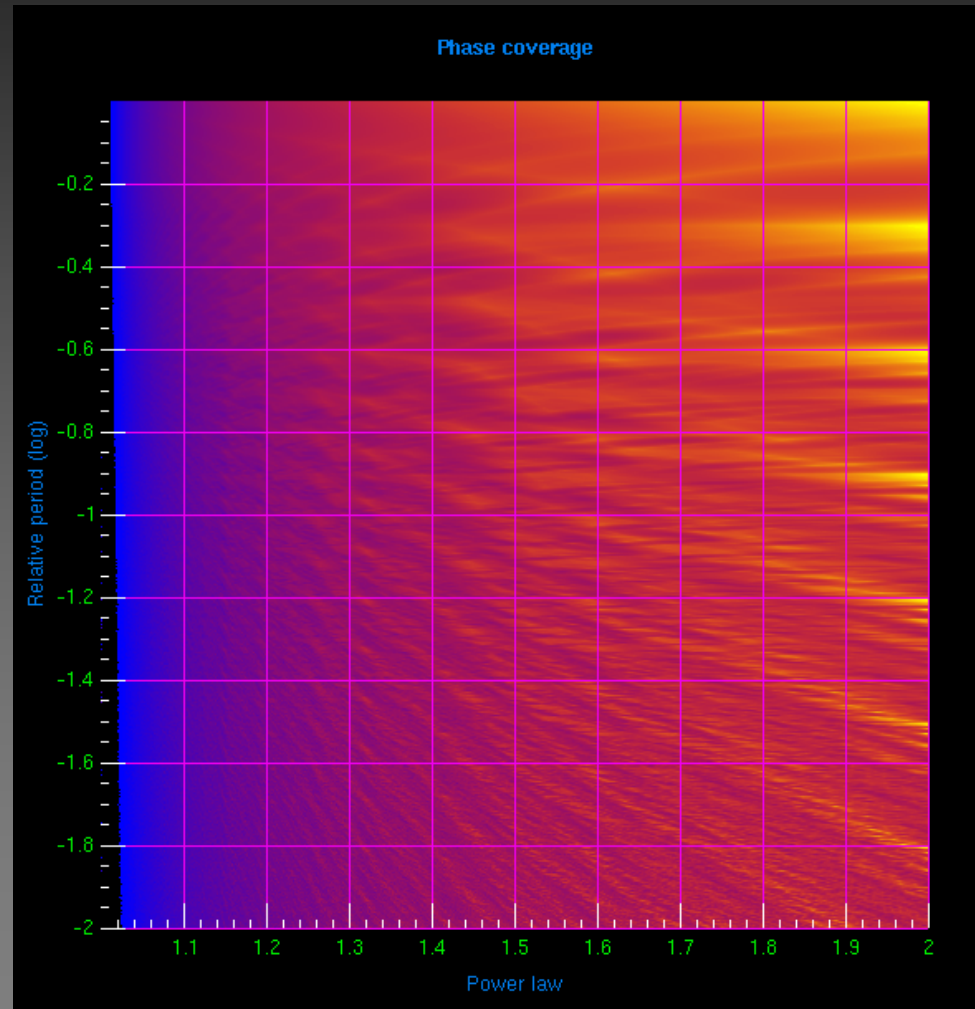
Alias ratio: A

- Expresses how well aliases are suppressed
- Critical to give credibility to a potential signal in the lightcurve



Power law observing

- Accepted wisdom is to observe in 'powers of 2'
- We don't think so...



Conclusions

- We have a detailed set of heuristics to probe lightcurves
- We have an agent infrastructure ready to exploit our techniques
- We can extend our architecture to allow planning from incomplete datasets – something previously impossible