Fitting Models Without Data Rejection

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- Observational data includes both good and bad data points.
- Ad-hoc methods used to remove the bad data introduce new problems.
- We use a mixture model (Hogg, Bovy, Lang 2010) to explicitly model both good and bad data.

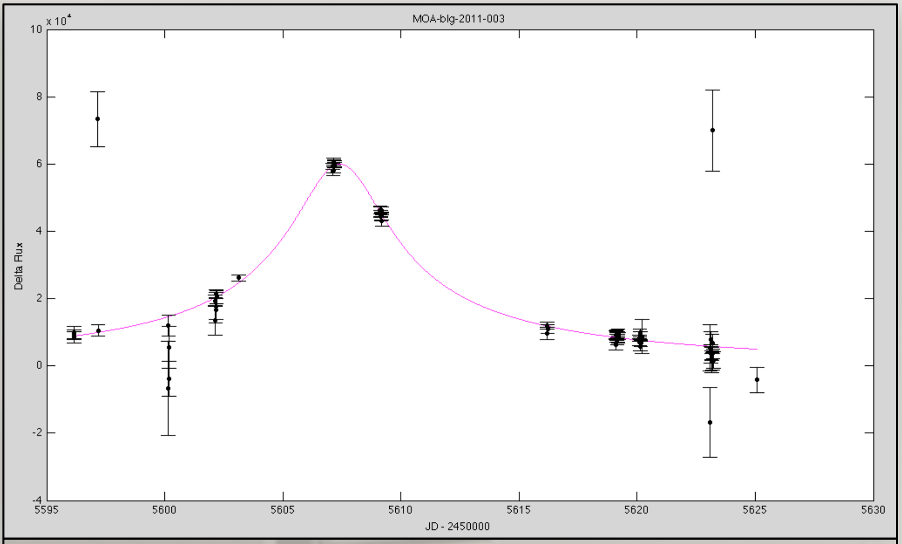
- The method utilises:
  - Markov Chain Monte Carlo
  - Bayesian Probability
  - Mixing model likelihood function

- Likelihood function of:

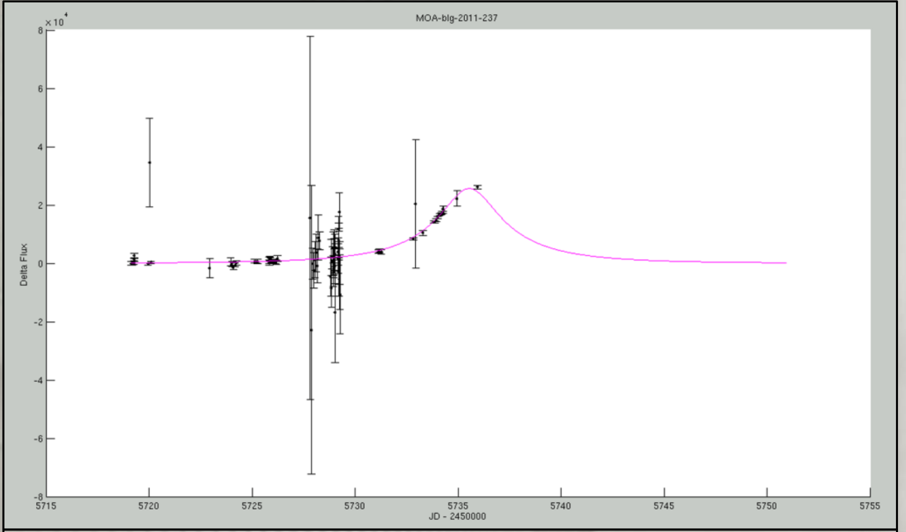
$$L \,\alpha \prod_{i=1}^{N} \left[\frac{1-P_b}{\sqrt{2\pi\sigma_{yi}^2}} \exp\left(-\frac{[\Delta F_i - F_0 A(u_o, t_0, t_E, t_i) + F_R]^2}{2\sigma_{yi}^2} \right) + \frac{P_b}{\sqrt{2\pi[V_b + \sigma_{yi}^2]}} \exp\left(-\frac{[\Delta F_i - Y_b]^2}{2[V_b + \sigma_{yi}^2]} \right) \right]$$

- Intend to set up a more robust early detection system for high magnification events.

- We will extend the method to incorporate multiple data set and binary lensing.



MOA 003: u_0 = 0.0457±0.0031 t_0 = 2455607.41±0.04 t_E = 45.15±2.20
P_b = 0.0059±0.0023 F_R = -146.016±0.000 F_0 = 2866.11±13.89



MOA 237: u_0 = 0.281±0.146 t_0 = 2455735.56±0.12 t_E = 5.36±1.19
P_b = 0.0170±0.0171 F_R = -9.6341±0.0000 F_0 = 9627.99±86.46