Constraining the EoR with Variance Statistic

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The quest for answers

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How?

Steps towards the EoR

- Remove bright sources
- Remove diffuse foregrounds ~5 K
- Win over noise ~120 mK
- If everything goes well ...

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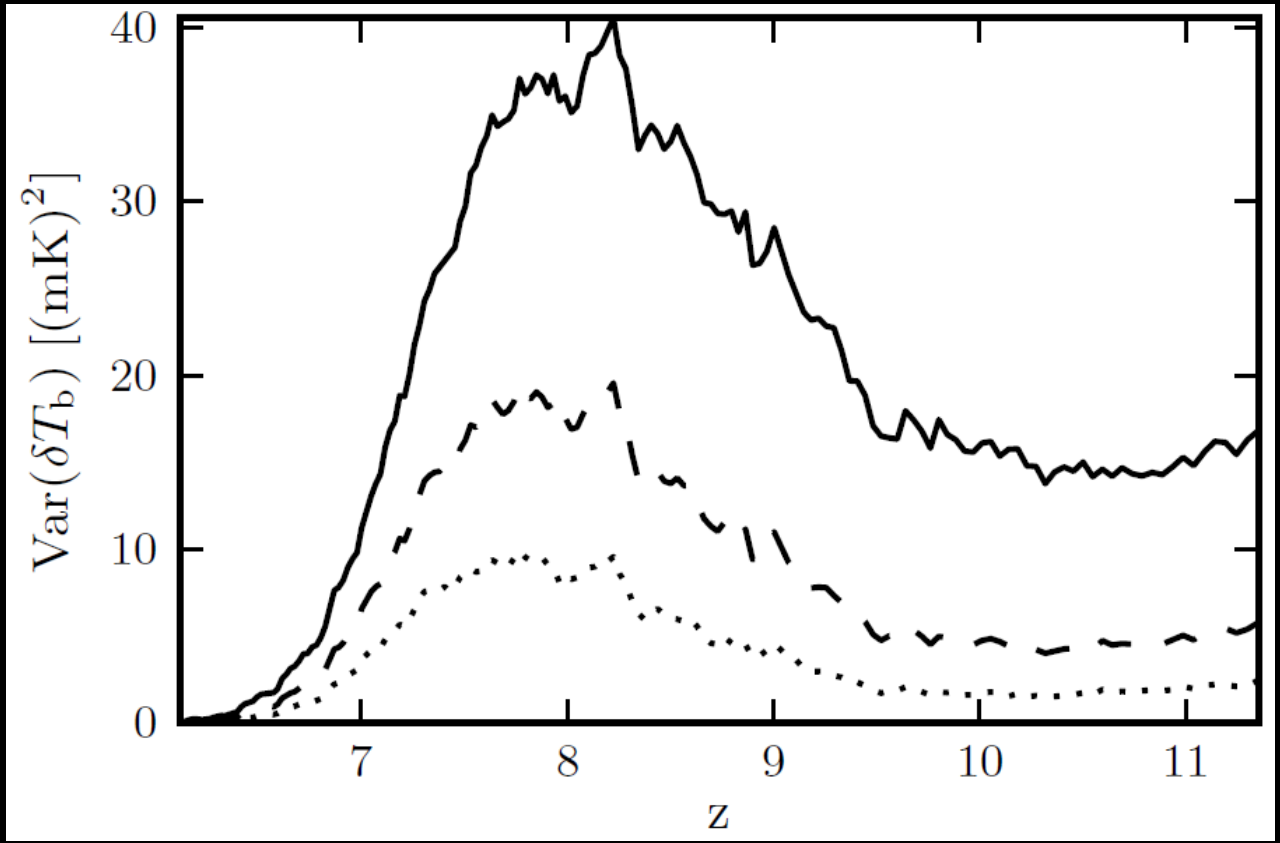
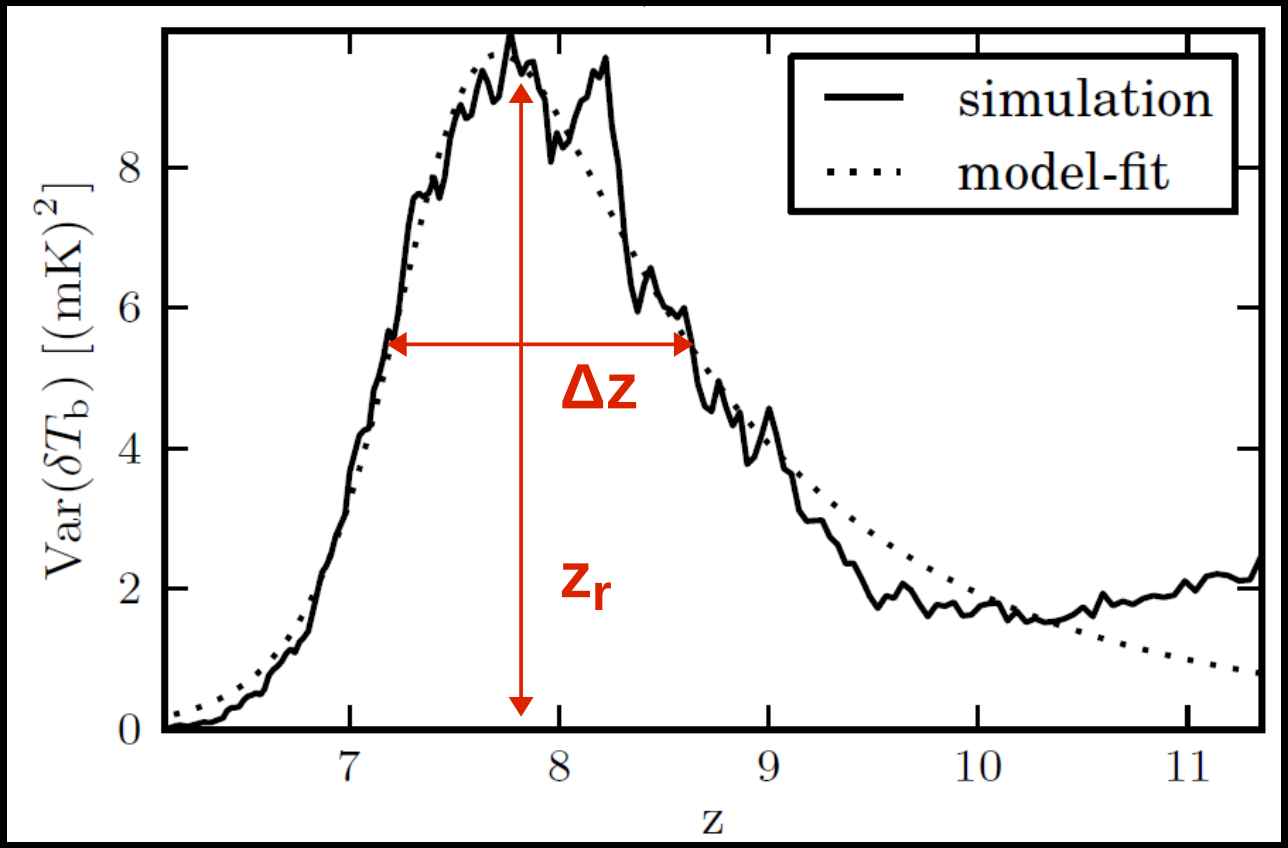
  - HI intensity mapping ~ 10 years?
  - Power spectrum analysis ~ 2-3 years
  - RMS / variance ~ 1 year

Signal Variance (simulation)



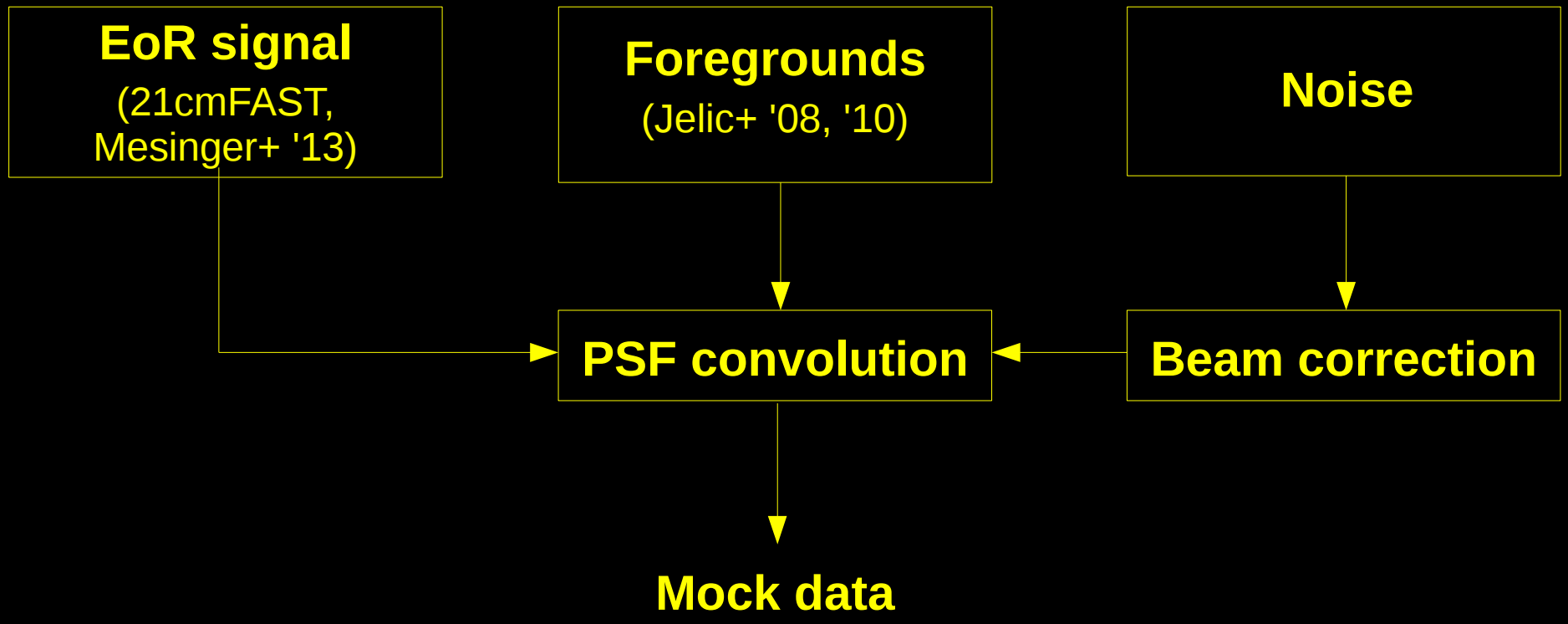
Parametrization



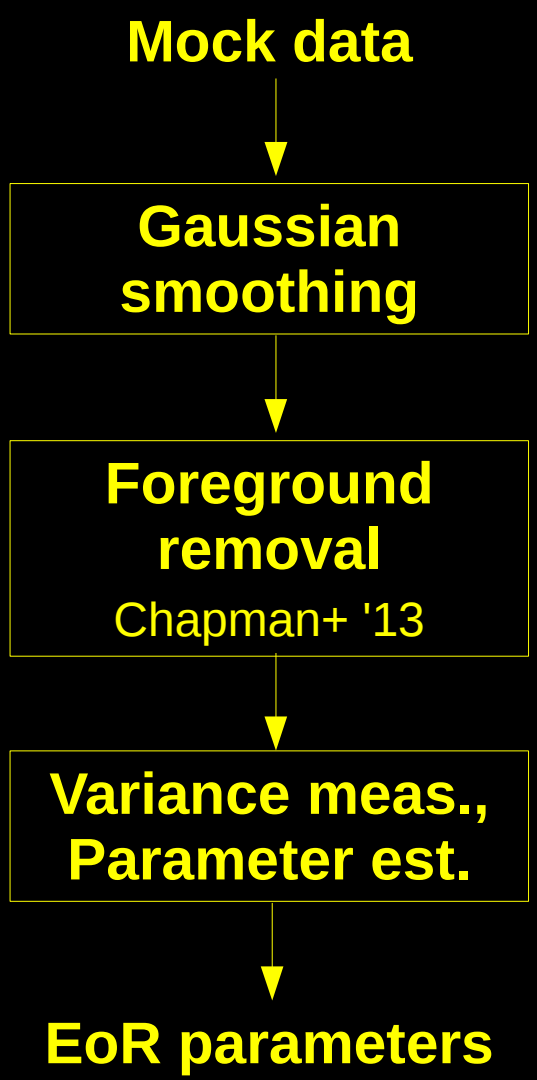
$$Var[\delta T_b(z)] = A\ f(z) \left(\frac{z}{z_0}\right)^{\beta}$$

$$f(z) = \frac{1}{2}\left[1 + \tanh\left(\frac{z - z_0}{\Delta z}\right)\right]$$

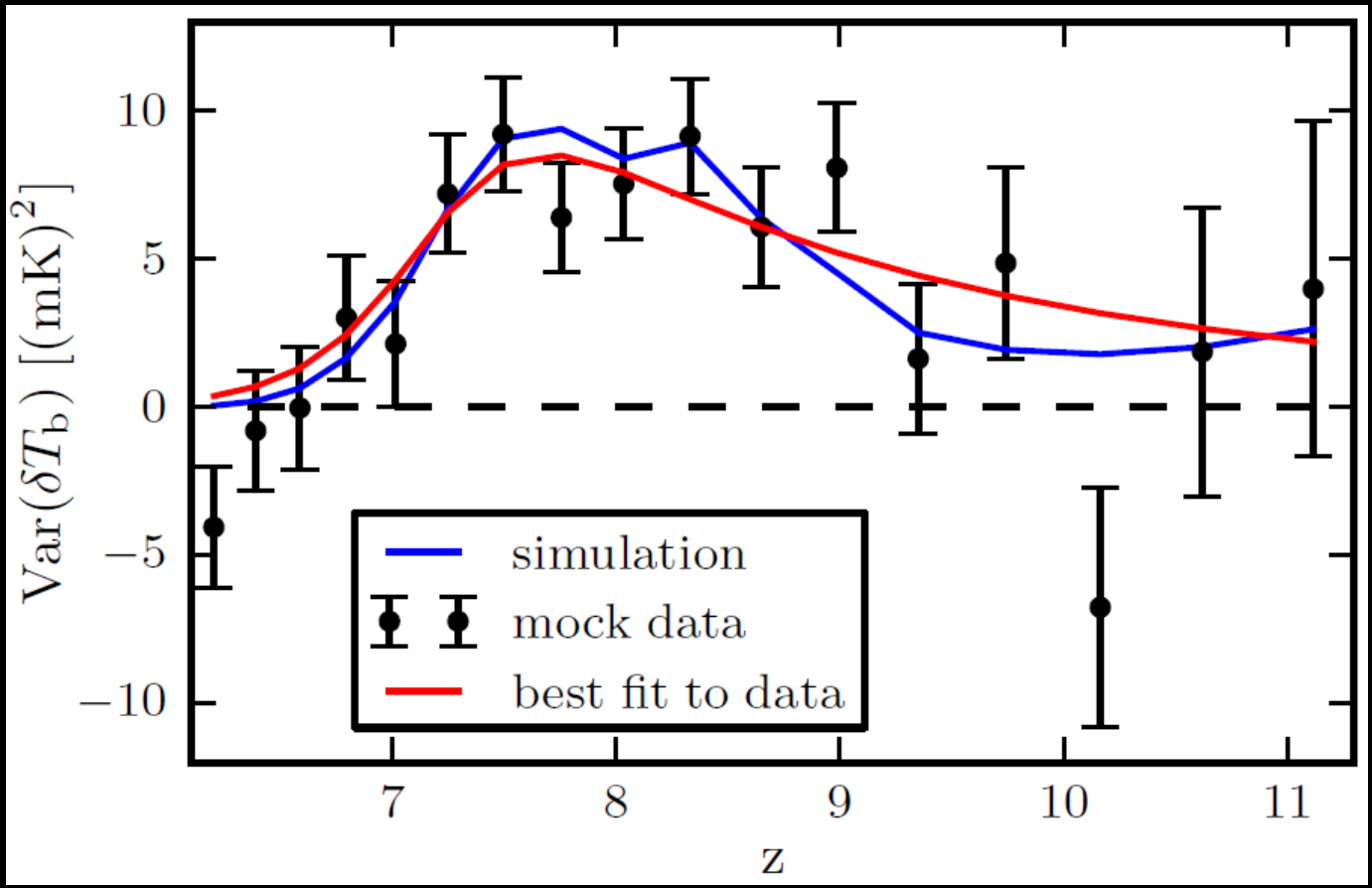
Simulation pipeline



Analysis pipeline



Results: 600 h (simulation)



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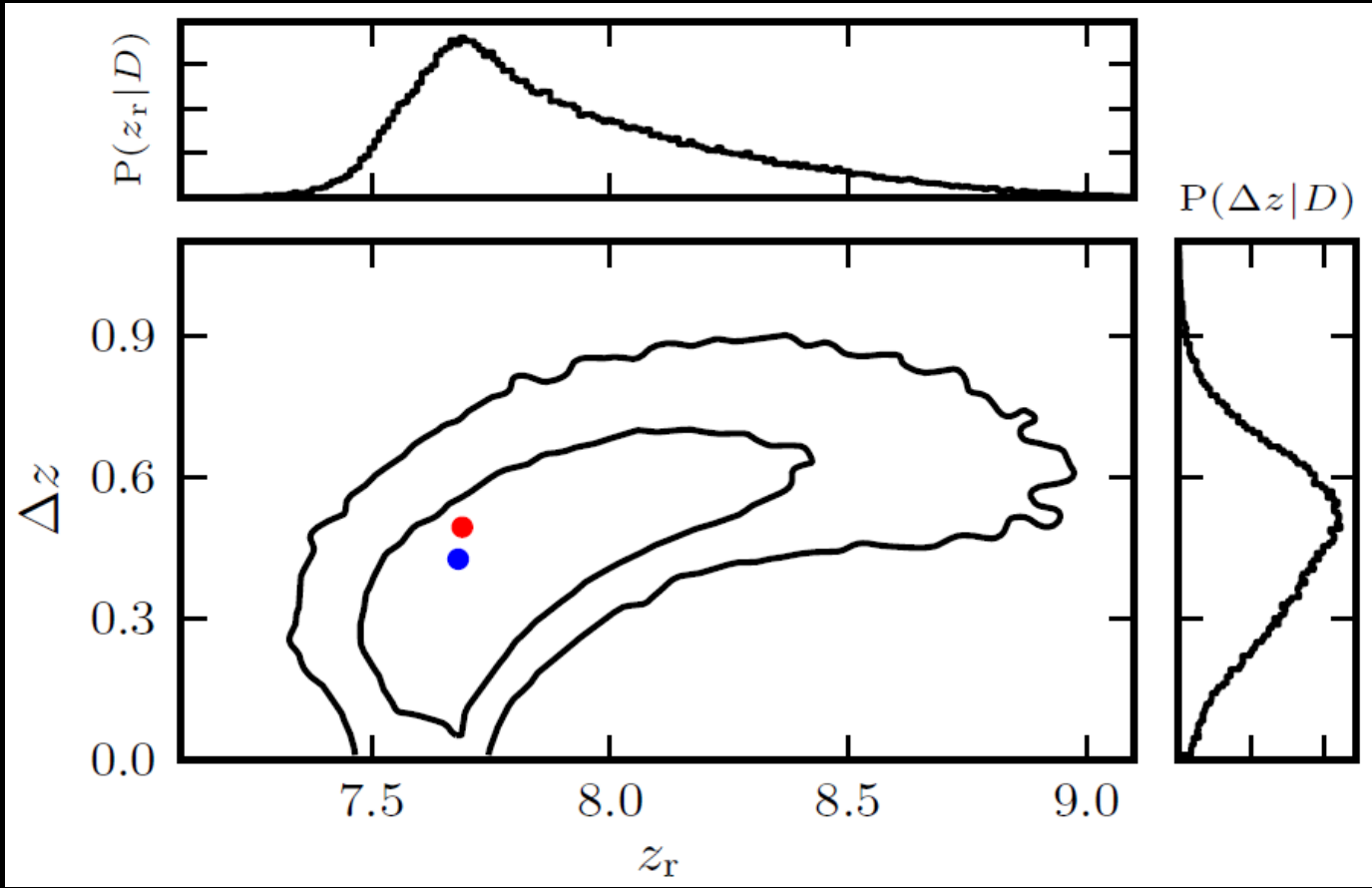
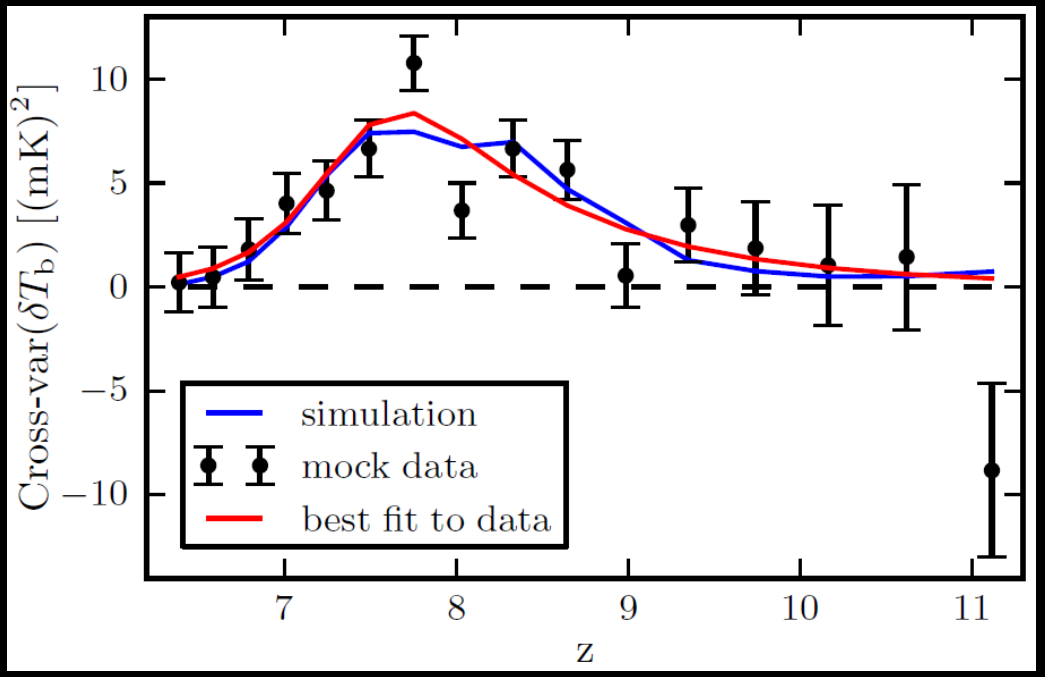
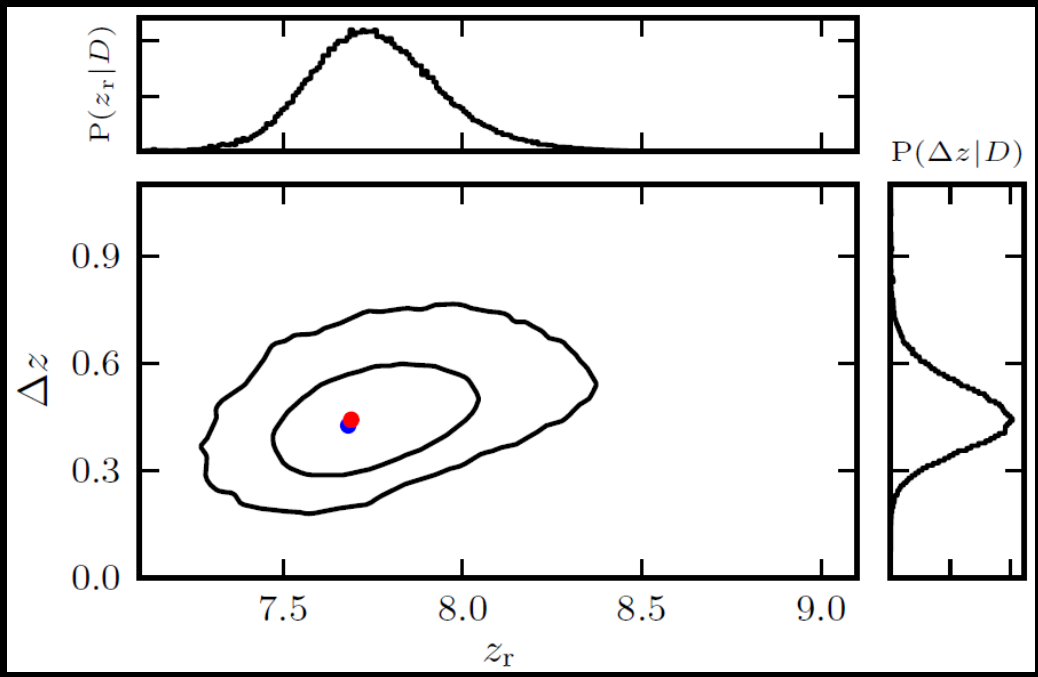
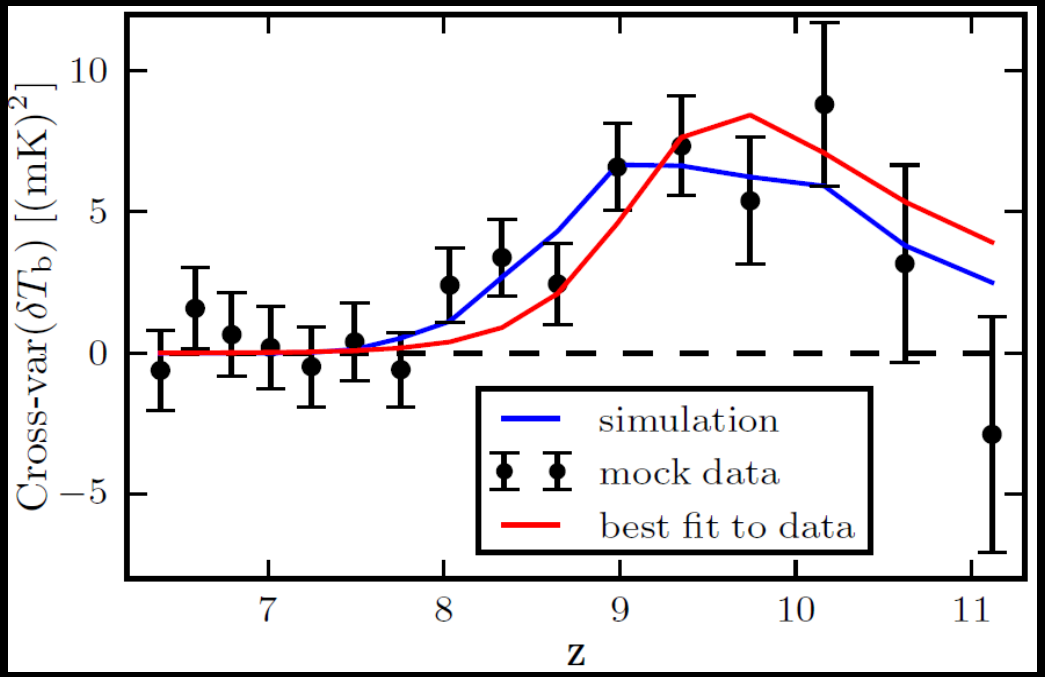


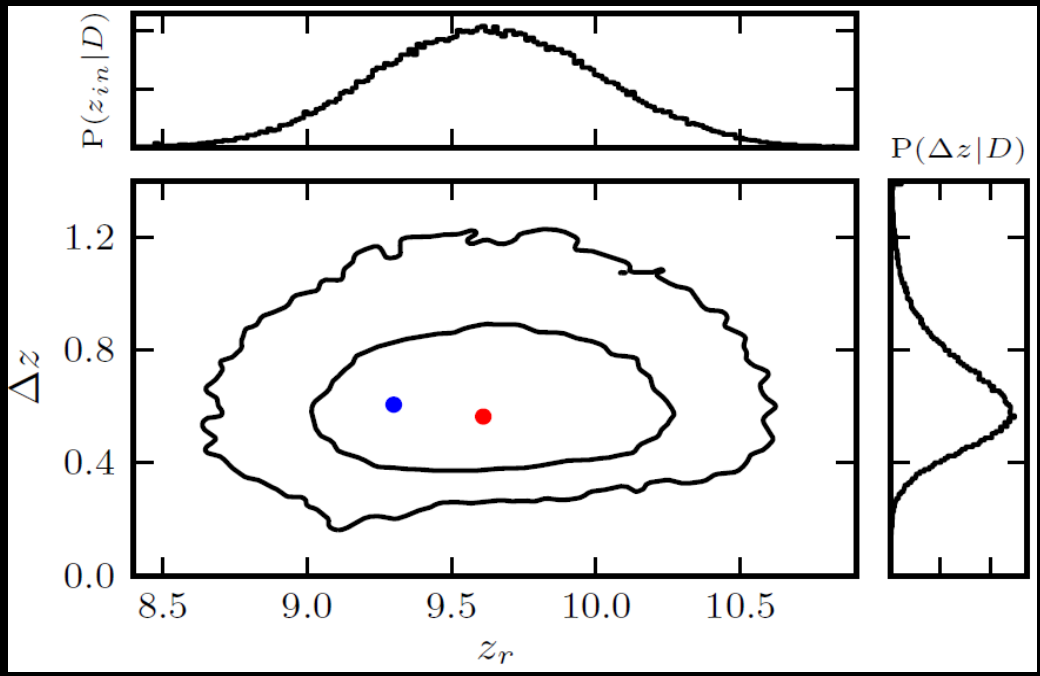
Results: Cross-variance



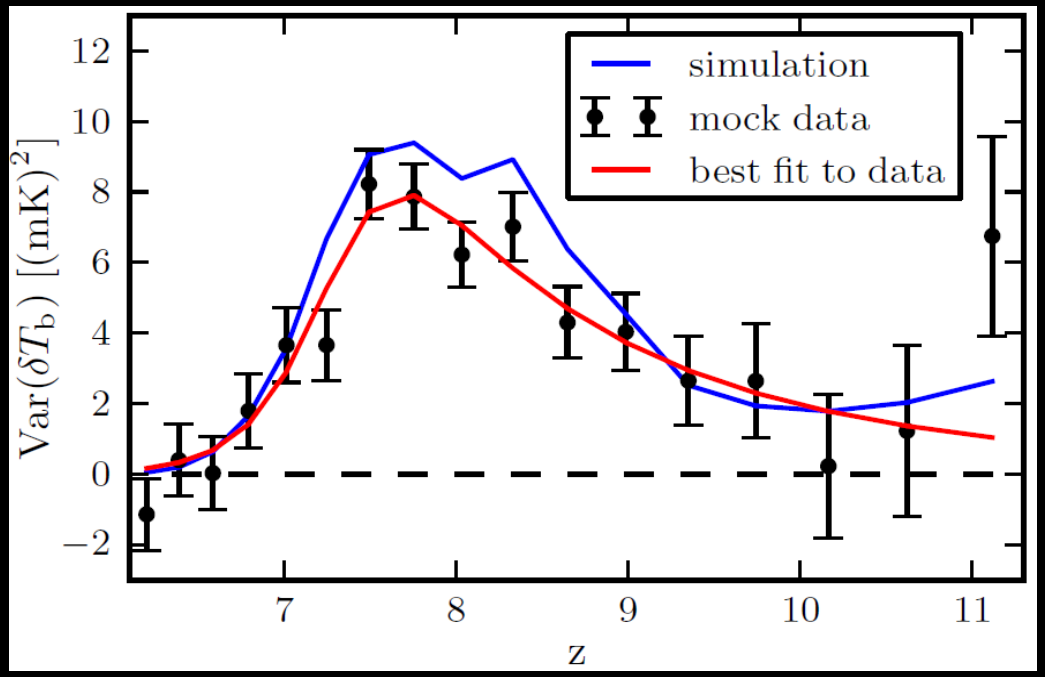


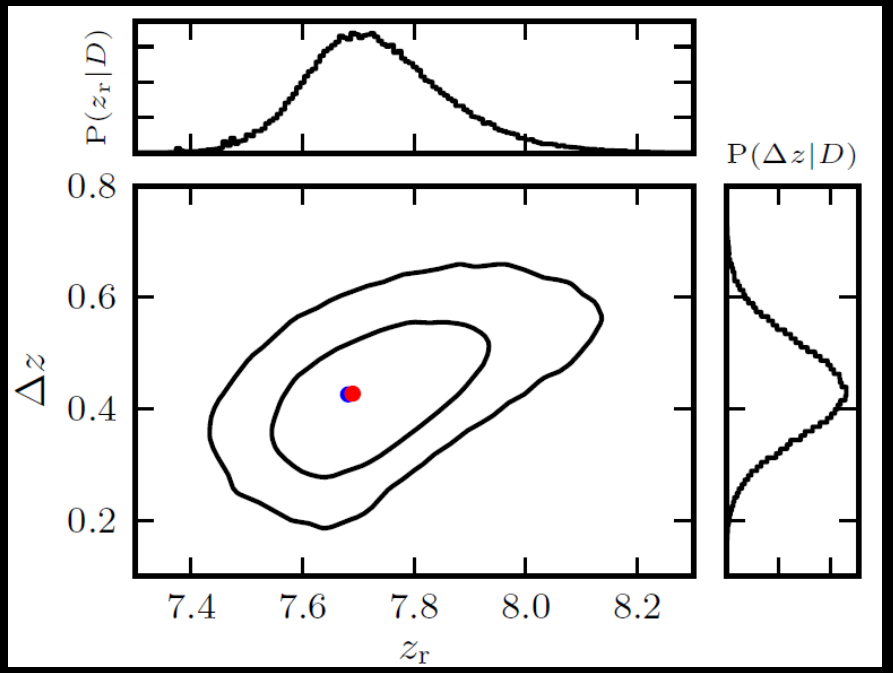
Different reionization history





Better quality data: 1200 h





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- End-to-end simulation, analysis pipeline
- EoR detection should be possible with 600 h on a field
- So where do we stand now?
  - 114 h data on NCP analyzed
  - results ….

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- EoR detection should be possible with 600 h on a field
- So where do we stand now?
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  - results …. See the next talk by Saleem Zaroubi