

# Automatic physical inference with information maximising neural networks

Physical Review D **97**, 083004

arXiv:1802.03537

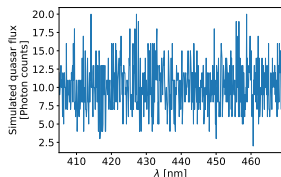
DOI [10.5281/zenodo.1175196](https://doi.org/10.5281/zenodo.1175196)

[github:information\\_maximiser](https://github.com/information_maximiser)

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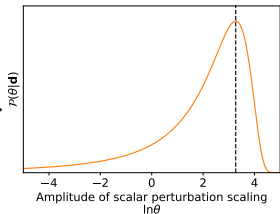
[charnock@iap.fr](mailto:charnock@iap.fr)

# How would we like to do inference?

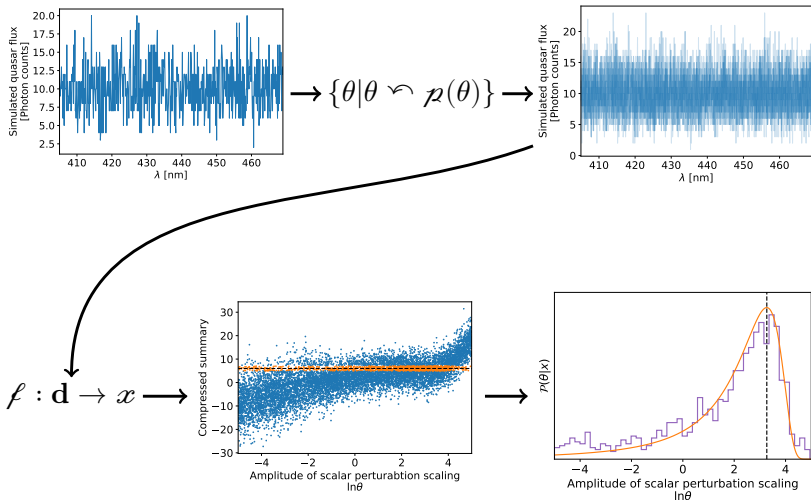


$\mathcal{L}(\mathbf{d}|\theta)$

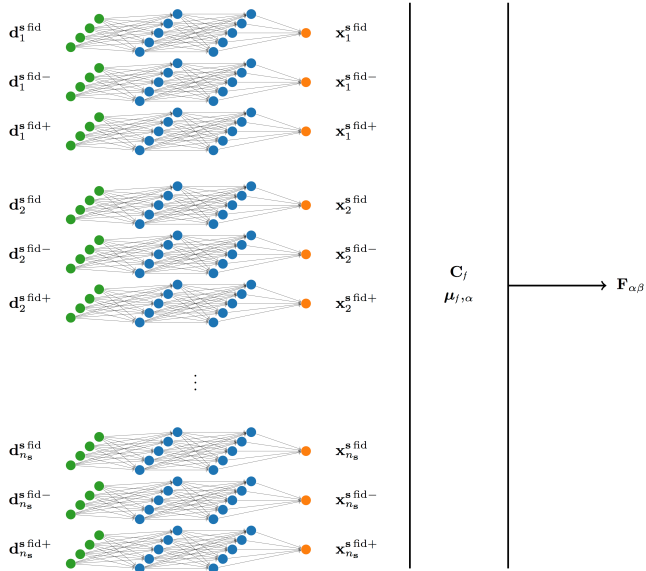
$$\mathcal{P}(\theta|\mathbf{d}) = \frac{\mathcal{L}(\mathbf{d}|\theta)p(\theta)}{p(\mathbf{d})}$$



# How can we do inference without a likelihood?



# How can we find the summaries?



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- ▶ Simulate data at a fiducial parameter value
- ▶ Train the network to increase the Fisher information
- ▶ Compress real data using trained network
- ▶ Do ABC with the optimally compressed summaries

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