Gauging the inner mass power spectrum of early-type galaxies

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Propositions

Accompanying the dissertation

Gauging the inner mass power spectrum of early-type galaxies

1. A realistic training sample is the key to the successful performance of a neural network to find strong gravitational lenses. **(Chapter 2)**

2. The galaxy mass power spectrum on kpc scales can be inferred from surface brightness fluctuations of extended lensed images. **(Chapter 3)**

3. The deflection angle structure-function in lensing has a mathematical similarity with ionospheric diffraction theory, except it is non-stationary. **(Chapter 3)**

4. A power law is a good first-order approximation of the power spectrum of kpc-scale density fluctuations in the inner regions of early-type galaxies. **(Chapter 4)**

5. The number of vertices in reconstructing the lensed source – using a Delaunay triangulation – has a significant impact on the solution bias in Bayesian lens modelling. **(Chapter 4, 5)**

6. Bayesian adaptive grid-based lens modelling is robust against changes in the type of regularisation and the choice of the mask when enclosing a sufficiently large area of noise-dominated sky. **(Chapter 5)**

7. An intrinsic degeneracy between the source and the mass model exists; whereas the source model affects the image surface brightness on all scales, the smooth lens model affects it mostly on large scales. **(Chapter 5)**

8. The average projected surface mass densities of simulated massive early-type galaxies significantly depend on different feedback processes in galaxy formation. **(Chapter 6)**

9. The projected surface mass density fluctuations of simulated massive early-type galaxies at kpc-scales appear invariant under changes in galaxy formation feedback mechanisms. **(Chapter 6)**

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