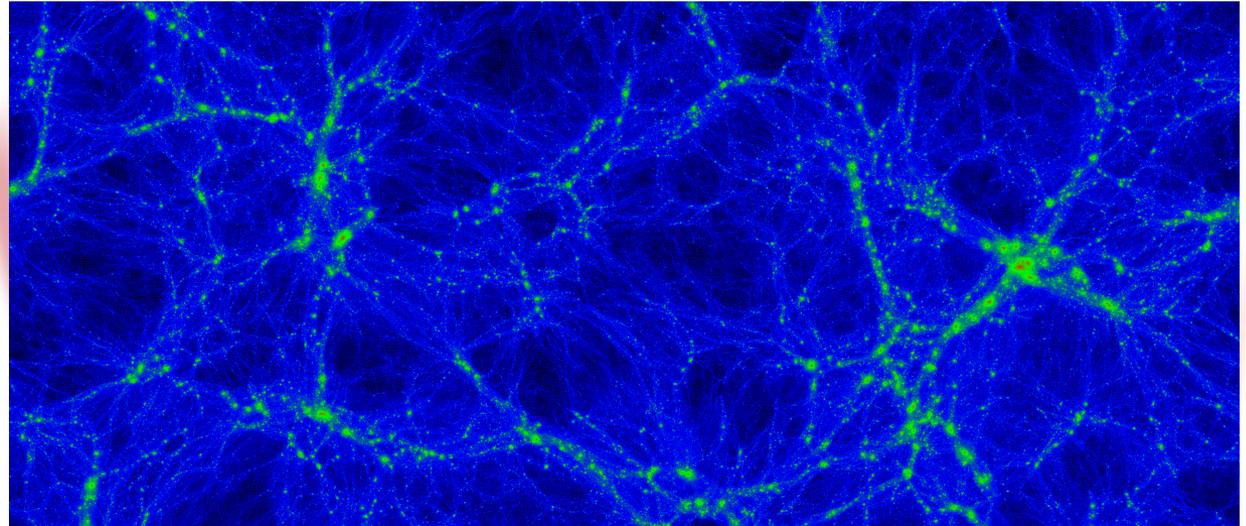




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Cosmological Theory & Simulations

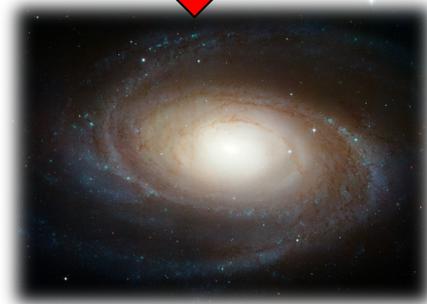
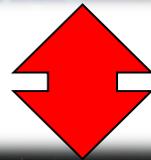
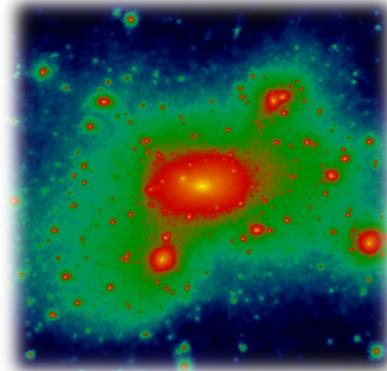
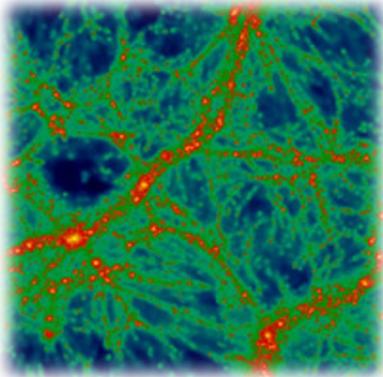
Modeling Dark Matter & Galaxy Formation



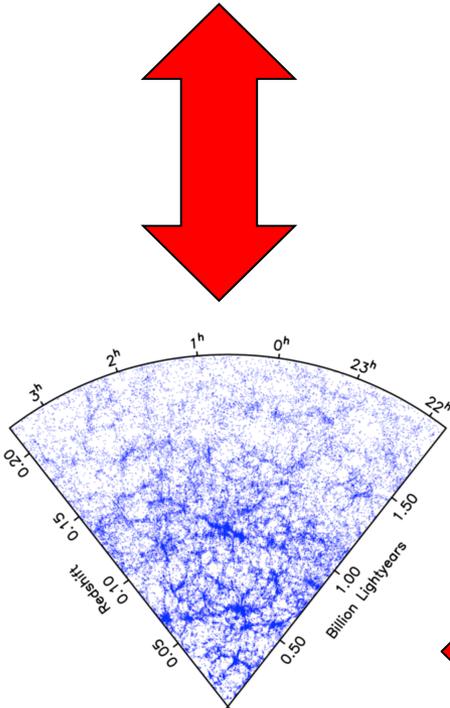
A/Prof Chris Power, SU3 Group Leader



What do we do?



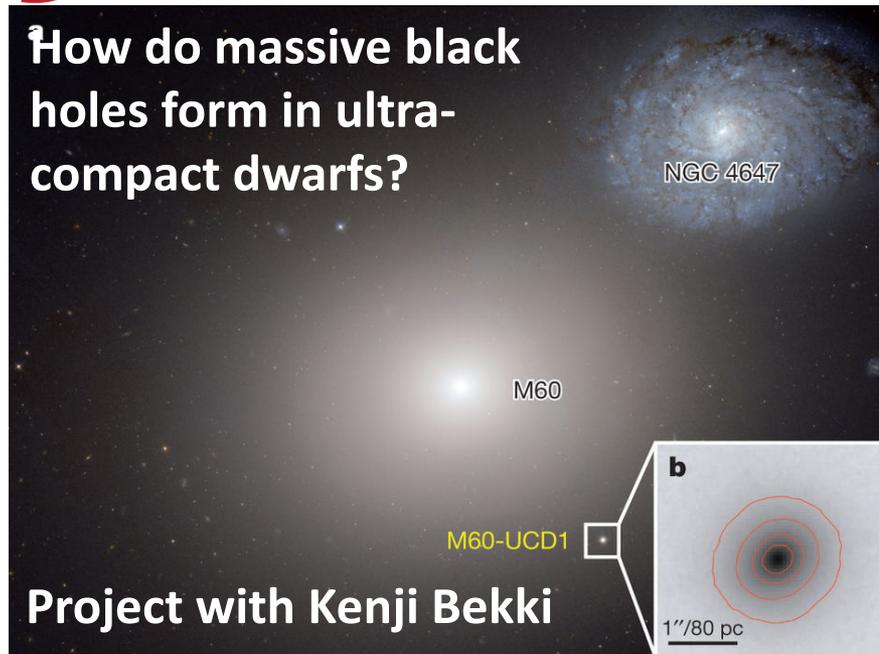
- Explore theories of **cosmology**, **dark matter**, and **galaxy formation**...
- ... using state-of-the-art **supercomputer simulations** and sophisticated **theoretical models**.
- Create mock observables to test model predictions and support **galaxy survey science**
- Develop **novel algorithms** and **statistical tools** to analyse and interpret data





Problems in Galaxy Formation

How do massive black holes form in ultra-compact dwarfs?



Project with Kenji Bekki

Do **super-massive black holes** grow in galaxies, or do galaxies grow around super-massive black holes?

Is **galaxy morphology** a product of nature or nurture?

Project with Danail Obreschkow



What physical processes make galaxies spin?



Problems in Galaxy Evolution

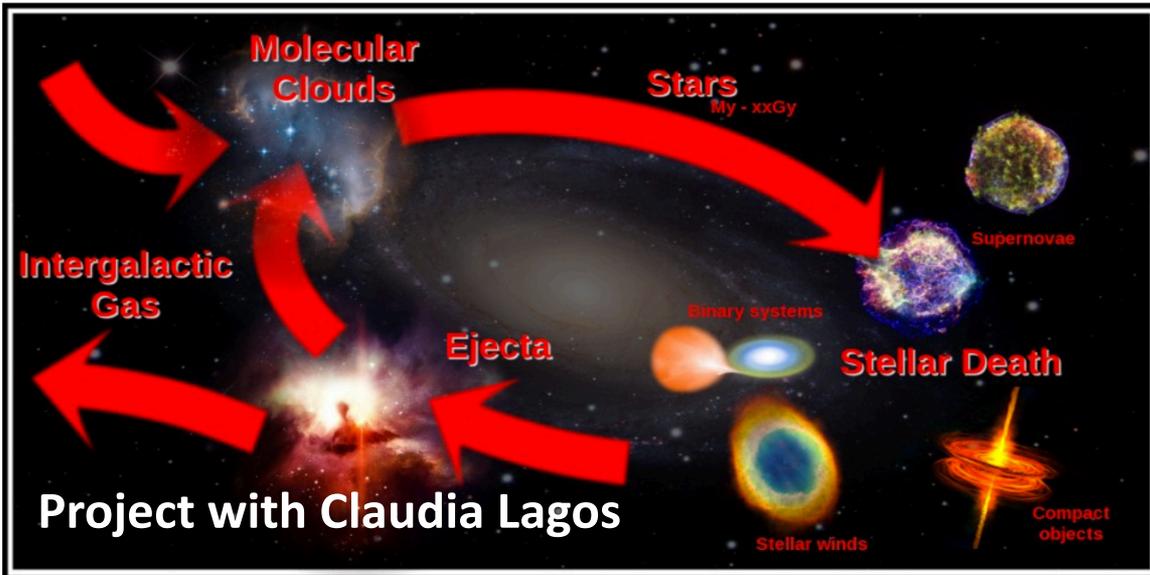
Project with Adam Stevens



How do massive black holes alter the growth of their host galaxies?

How much of a **transformational** influence can **super-massive black holes** be on their host galaxies?

How do the **chemical elements**, yielded by the stars that forge them in their interiors, **enrich their host galaxies**?



Project with Claudia Lagos

Project with Chris Power & Lilian Garrat-Smithson





Problems in Dark Matter

How does **dark matter** influence the **observable properties of galaxies**?

Can we use the stars around galaxies to **test our theories of dark matter**?



Project with Aaron Ludlow



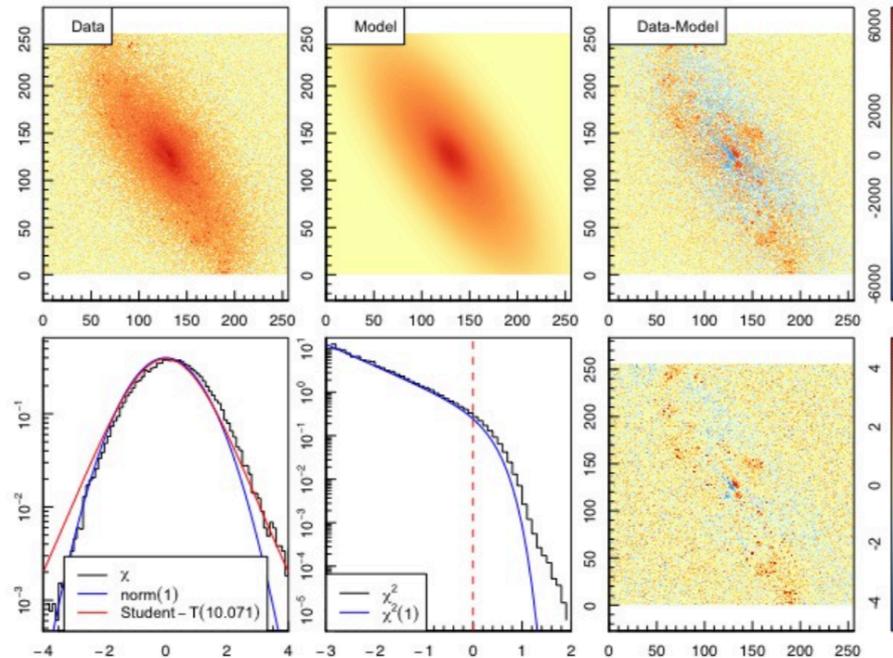
Project with Chris Power



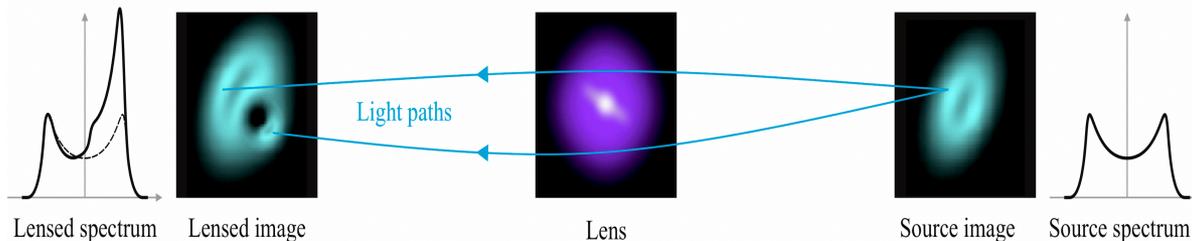
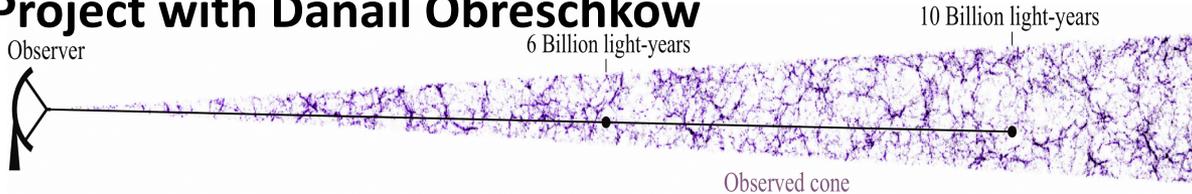
Problems in Modelling

Project with Claudia Lagos, Kate Harborne, & Aaron Robotham

What can **galaxy structure** tell us about the **physics of galaxy formation**?



Project with Danail Obreschkow



How can we explore **dark matter** and **distant galaxies** through **gravitationally lensed radio signals**?