/66

4

Simulators

$$x \sim p(x)$$

Simulators are ubiquitous: *they prescribe a way to sample from the data distribution*

Collider data

$$\text{particles} \sim p(\text{particles})$$

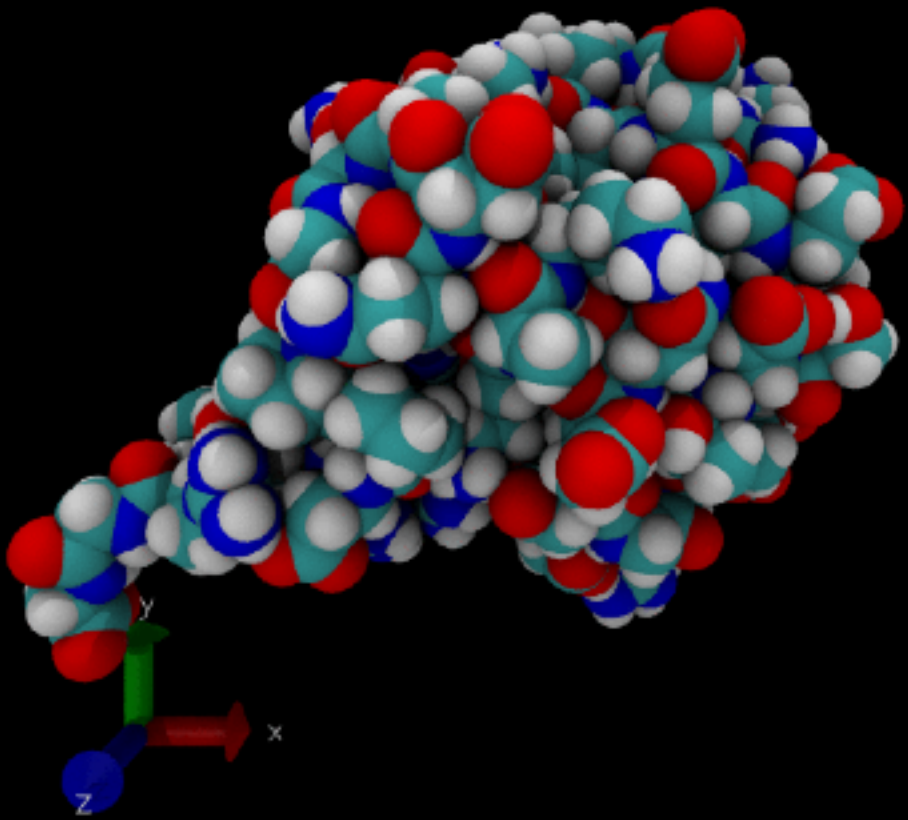

ATLAS
EXPERIMENT

Cosmology data

$$\text{particles} \sim p(\text{particles})$$

Molecular dynamics

$$\text{configurations} \sim p(\text{configurations})$$


y
x
z

[C. Cesarotti with ATLAS]

[Aquarius simulation]

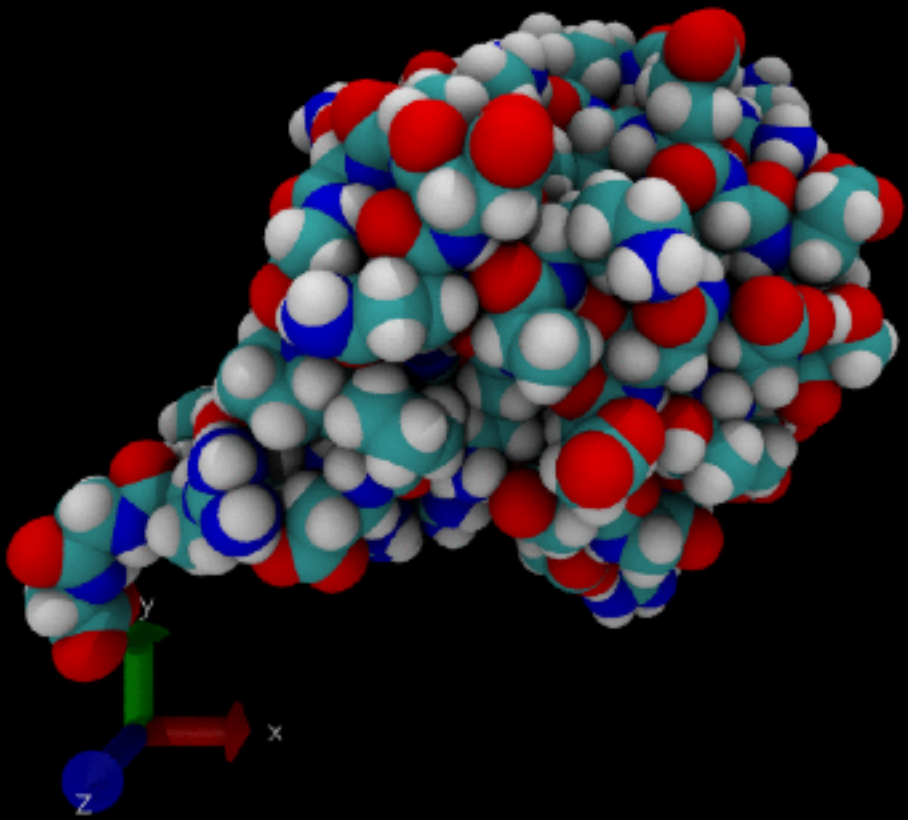
[E. Cances et al]

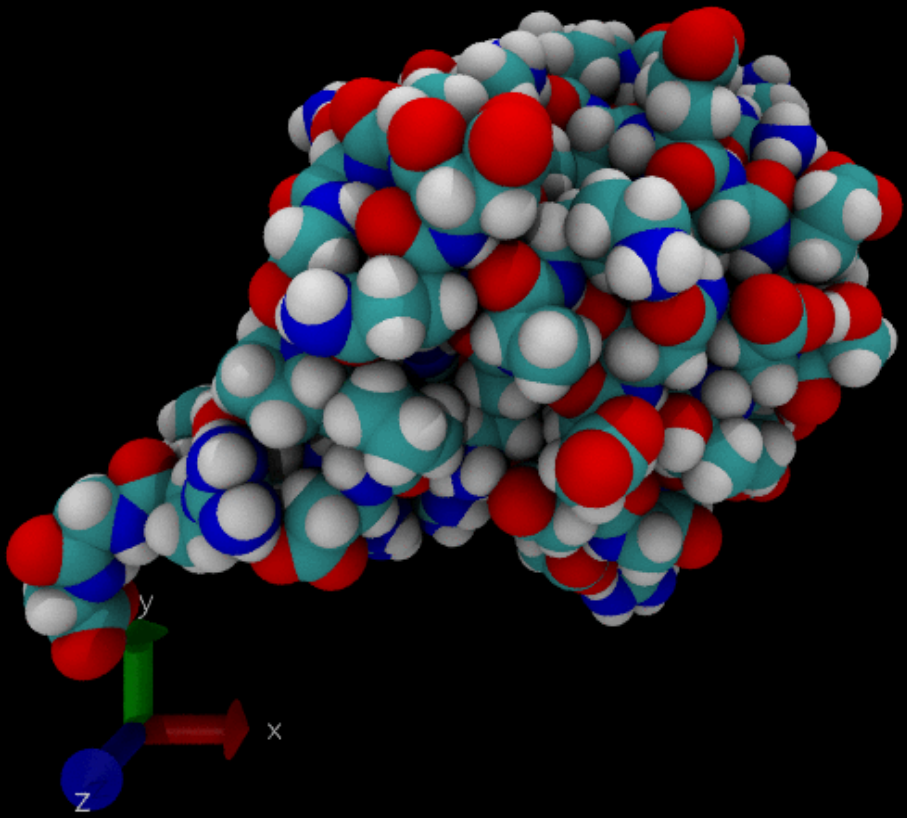

z = 30.3
T = 0.10 Gyr
500 kpc


ATLAS
EXPERIMENT


ATLAS
EXPERIMENT


z = 30.3
T = 0.10 Gyr
500 kpc


y
x
z


y
x
z

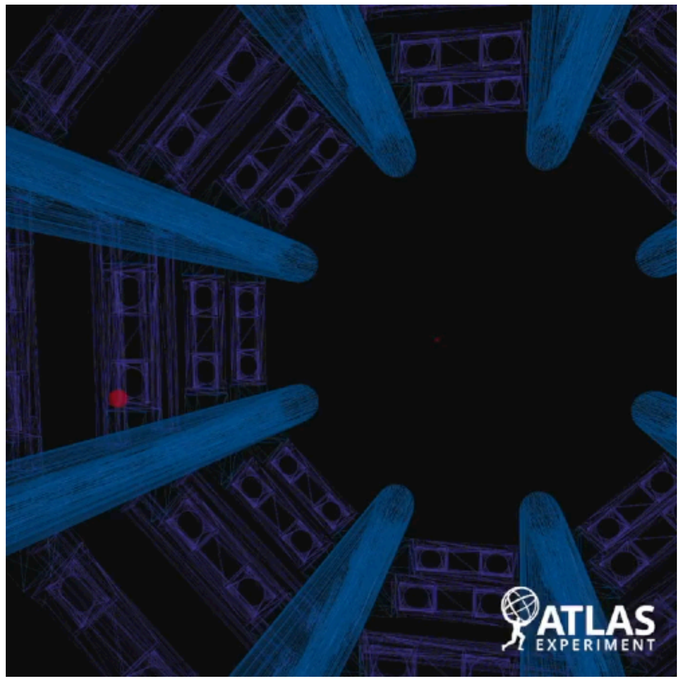
Simulators

$$x \sim p(x)$$

Simulators are ubiquitous: *they prescribe a way to sample from the data distribution*

Collider data

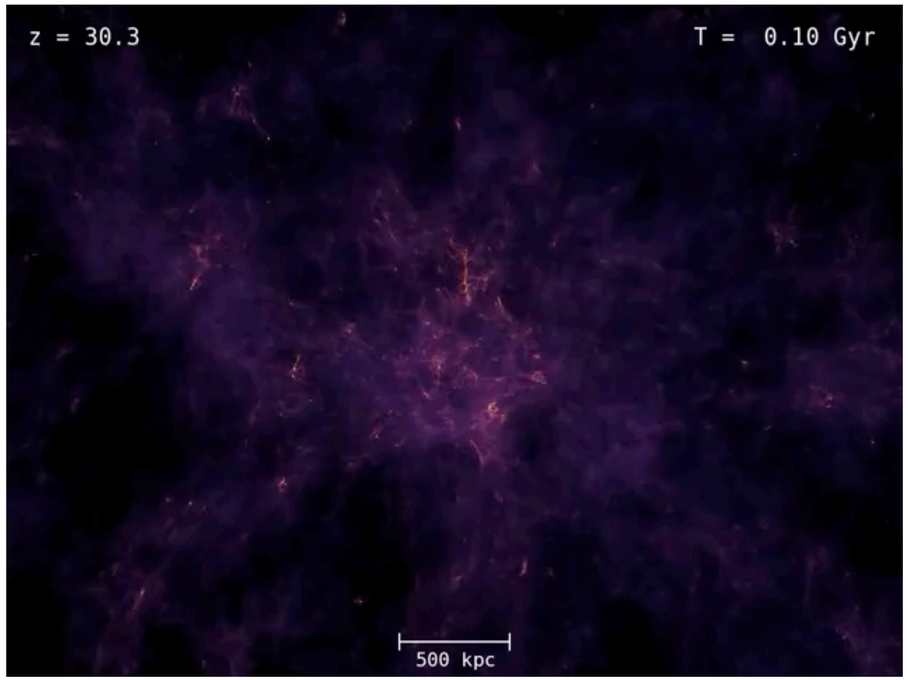
particles $\sim p$(particles)



[C. Cesarotti with ATLAS]

Cosmology data

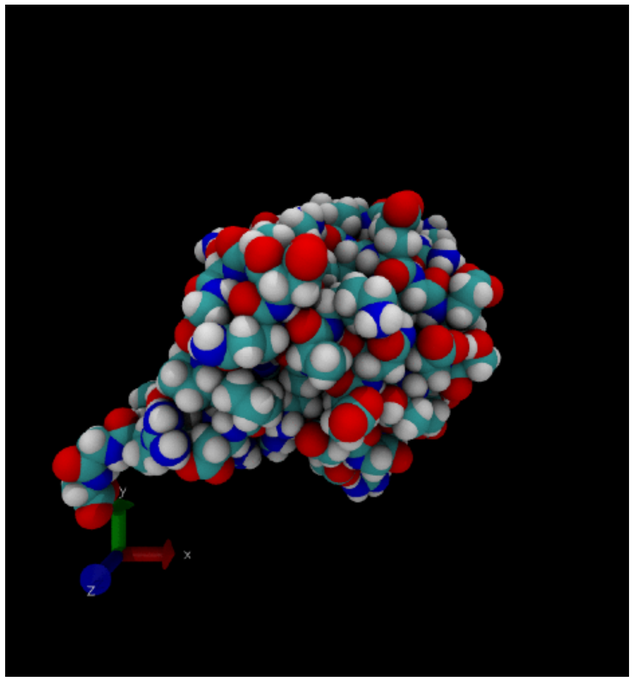
particles $\sim p$(particles)



[Aquarius simulation]

Molecular dynamics

configurations $\sim p$(configurations)



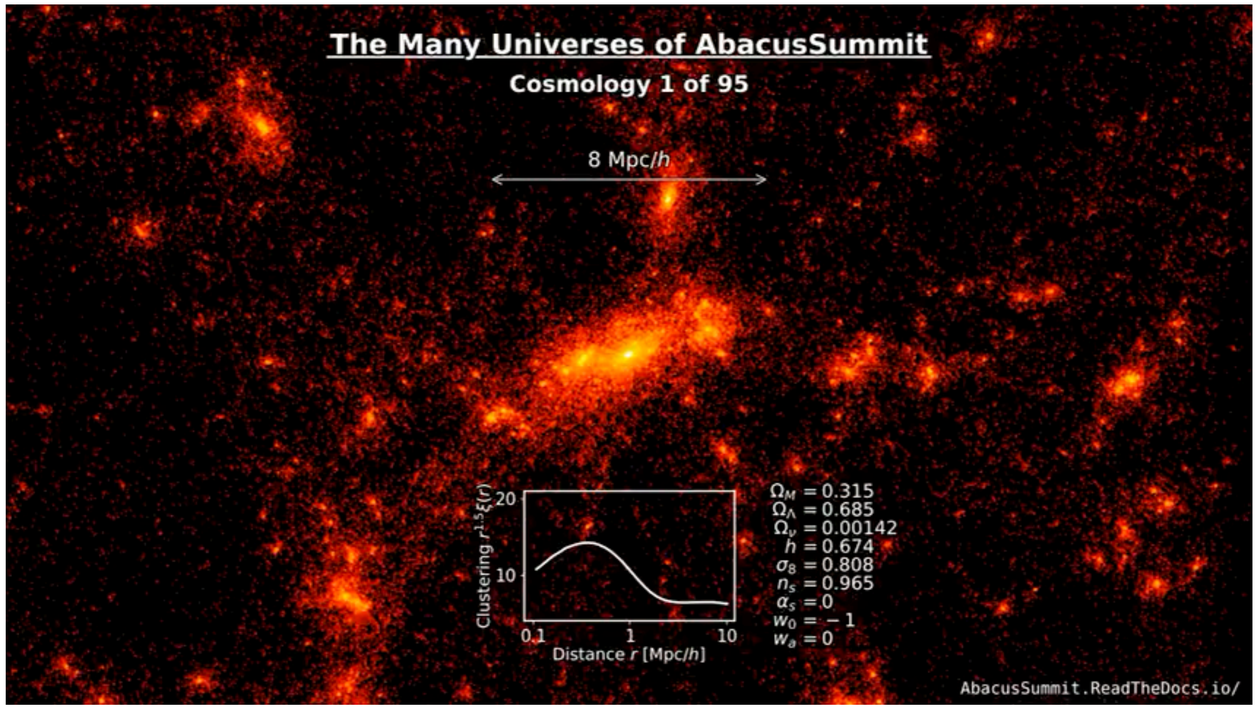
[E. Cances et al]

Conditional simulators

Conditional simulations *sample from the likelihood* $p(x \mid \theta)$

Cosmology data

$$\text{particles} \sim p(\text{particles} \mid \{\Omega_m, \sigma_8\})$$



[Abacus Summit]

$$x \sim p(x; \mathscr{M})$$

Model

or

$$x \sim p(x \mid \theta)$$

Model parameters