

Surrounding Matter Theory : latest developments

The latest developments in Surrounding Matter Theory [1] are presented.

Surrounding Matter Theory [1] is a modification of Newton's law which shows tremendous predictions: it seems to solve each gravitational mysteries.

This is reminded in this poster. Then the latest improvements of this model will be explained. The strongest improvement is the following.

This model is derived from a relativity based on the assumption that matter is made of particles moving at the speed of light (see the other poster untitled « Discrete relativity »).

1) The model

The Newtonian potential $\Phi_n = -\frac{MG}{x}$

is multiplied by a factor : $\Phi = -\frac{MG}{x} \frac{\alpha_0 \rho_0 + \rho_{u0}}{\alpha \rho + \rho_u}$

$$C_{STET} = \frac{\alpha_0 \rho_0 + \rho_{u0}}{\alpha \rho + \rho_u}$$

ρ
 ρ_0
 ρ_u
 ρ_{u0}
 α

$$\alpha = \alpha_0 = 1.610^{-5}$$

New equation

$$R_{\mu\nu} - \frac{1}{2} R g_{\mu\nu} = \frac{8\pi G}{c^4} S_{\mu\nu}$$

$$S_{\mu\nu} = C_{\mu}^{\rho} C_{\nu}^{\sigma} T_{\rho\sigma}$$

$$C_0^{\nu} = \sqrt{C_{STET}} \delta_0^{\nu} \quad C_i^{\nu} = \sqrt{s} \delta_i^{\nu}$$

New Lagrangian

$$L_{STET} = \int \sqrt{-g} R_{STET} dx^4 + L_M + L_{CSTET}$$

4) Bullet cluster (1E0657-558)

Potential of attracting gas :

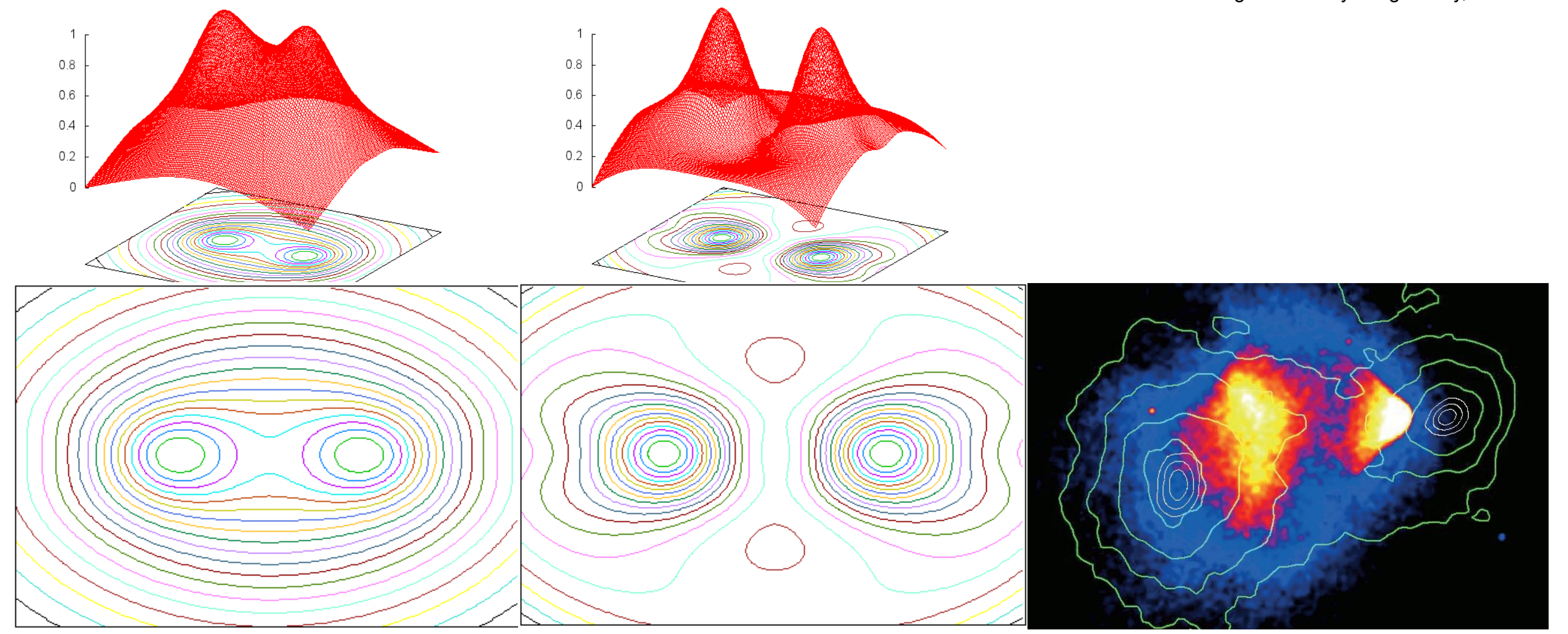
$$\Phi_g(M) \propto \frac{G}{D_M(N) * \rho_g(N)} * \rho_g(N)$$

$\rho_g(N)$ is the mass density of the gas.

$d(M,N)$ is the distance between the convoluting N variable and the M point.

$D_M(N)$ is equal to 1 in the sphere centered on M, of a 15 kpc ray, equal to 0 elsewhere.

$\Phi_g(M)$ is the resulting acceleration potential generated by the gas only, in SMT.



Newton's law

SMT

Reality

Weak-lensing mass reconstructions

2) Virial theorem explanation

Supposing IGM matter density over Universe density being equal to $\rho_{IGM} / \rho_{u0} = 7$

$$\Rightarrow G \text{ is 5 times greater : } C_{STET} = \frac{\alpha_0 \rho_0 + \rho_{u0}}{\rho_{IGM} + \rho_{u0}} = 5$$

3) Cosmology

New Friedmann-Lemaître equation $H^2 = \frac{8\pi G}{3} \rho_c$

\Rightarrow a de Sitter Universe is predicted, with :

- an alternative to dark energy,
- an explanation of the fine tuning issue,
- acceleration of expansion : the deceleration parameter is $q = -1$
- flat space : the space curvature is $K = 0$

\Rightarrow Time since last scattering is now $68 \text{ h}^{-1} \text{Gyr}$ which is 7 times greater than with ΛCDM .



Galaxy Cluster XMMU J2235.3-2557

\Rightarrow High-z clusters are predicted

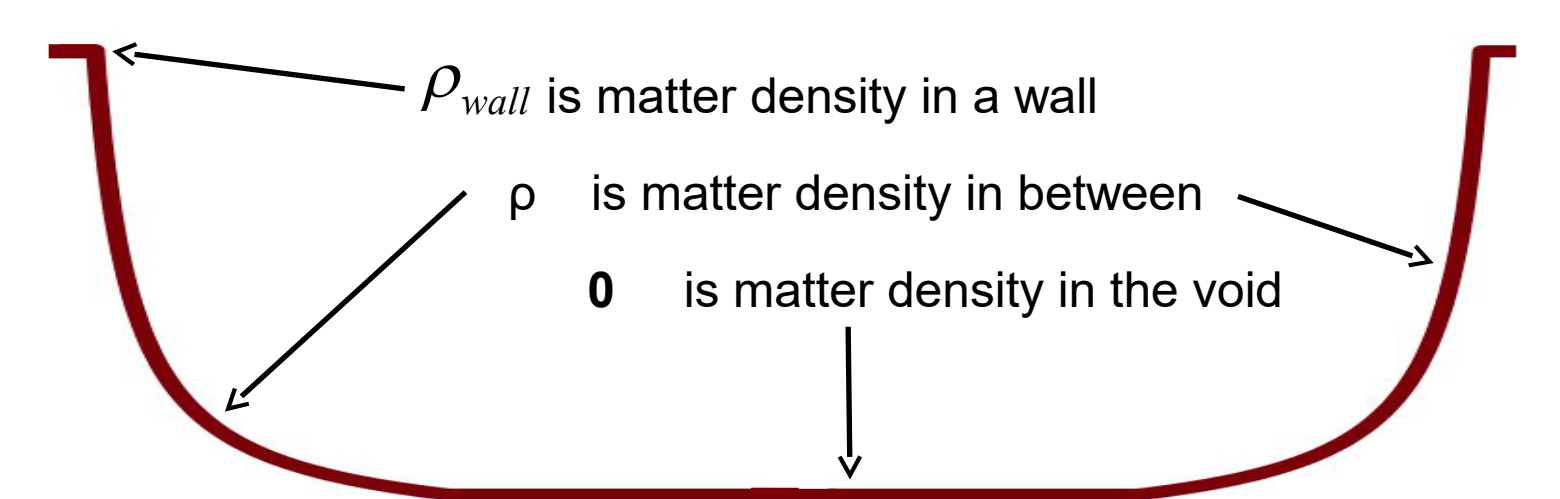
5) Heterogeneities of large scale structures

In a void, G is 40 times greater :

Empty voids are predicted, in a **stable equilibrium** :

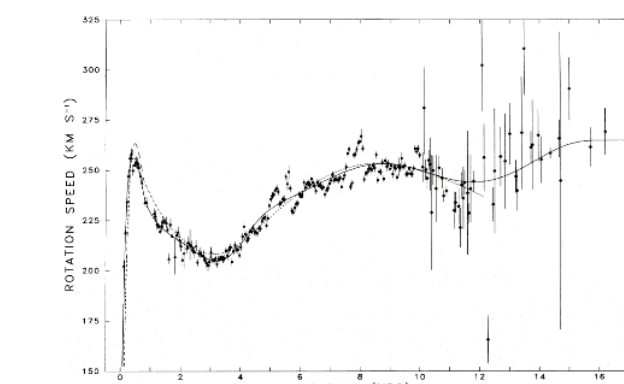
$$\rho = (\rho_{wall} + \rho_{u0}) \frac{x_{wall}}{x} - \rho_{u0}$$

$$C_{STET} \cong \frac{\alpha_0 \rho_0 + \rho_{u0}}{\rho_{u0}} = \frac{2}{\Omega} = 40$$

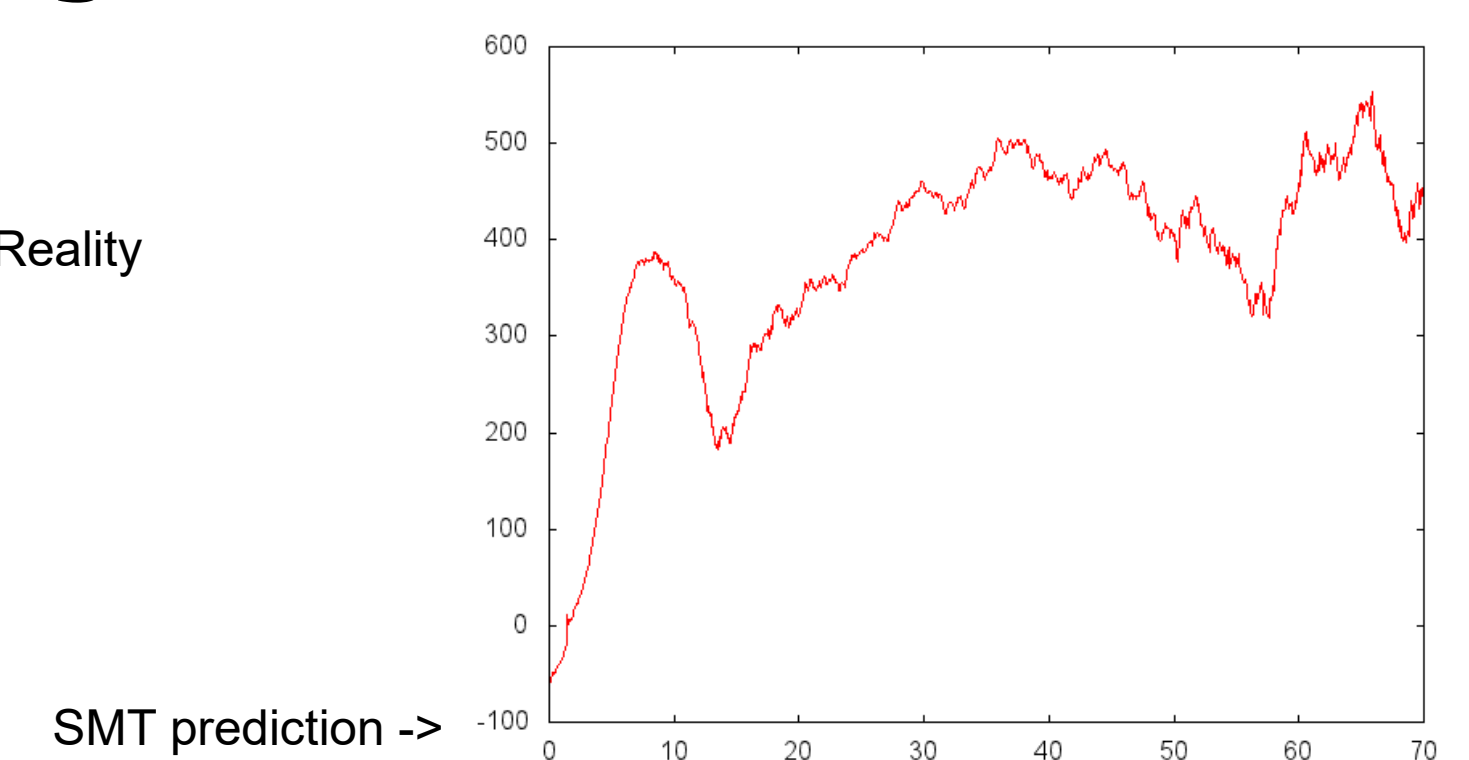


6) Simulated galaxies

Speed profiles :

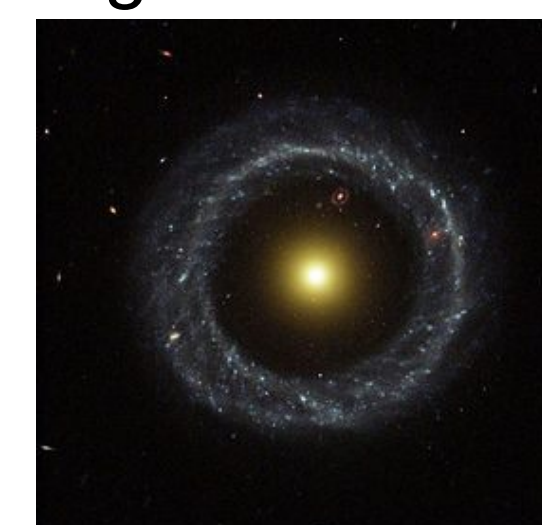


<- Reality

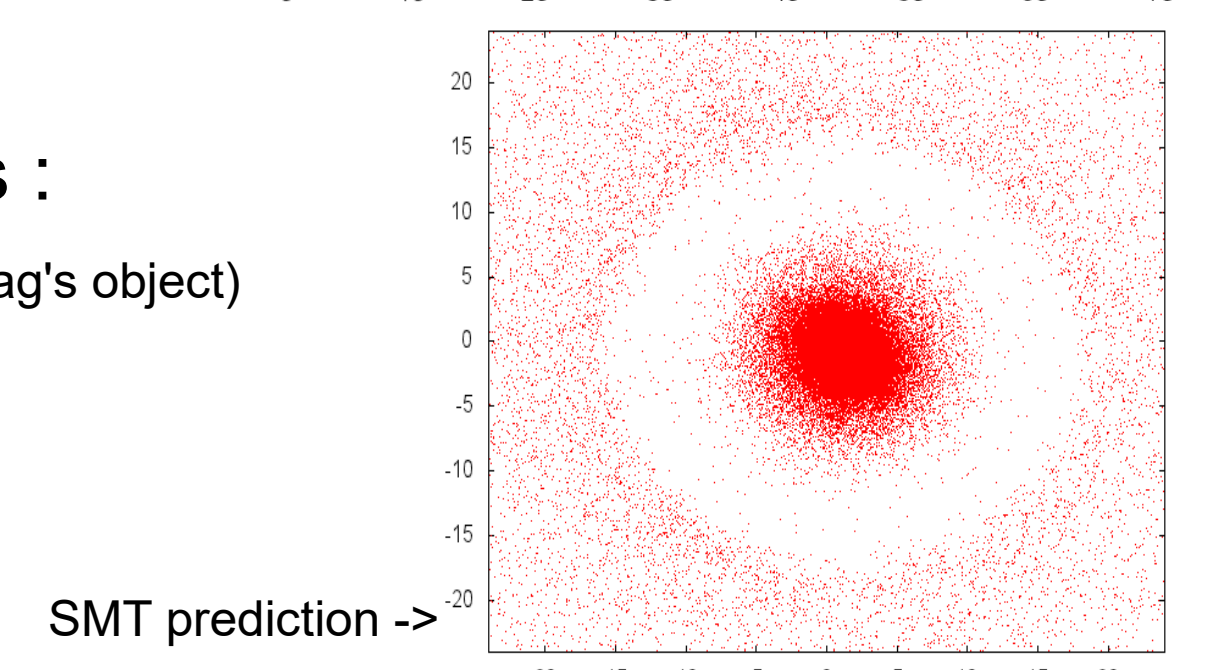


SMT prediction ->

Self-generated ring galaxies :



<- Reality (Hoag's object)



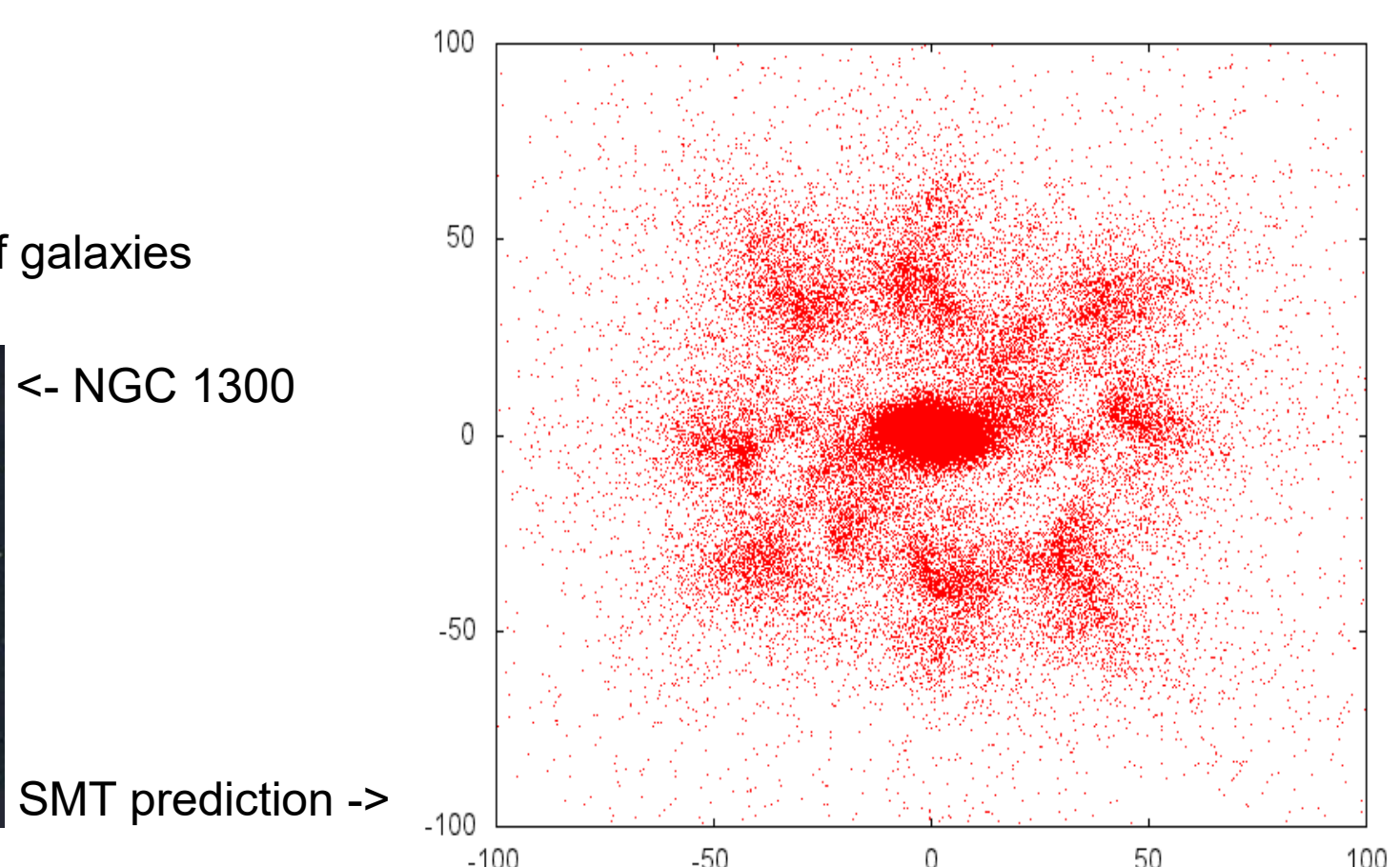
SMT prediction ->

Structure :

- fully unrolled arms,
- fast rotating bars,
- self-generated dwarf galaxies
- And more



<- NGC 1300



SMT prediction ->

[1] F. Lassiaille, EPJ Web of Conf 182 03006 (2018).

Images are from Anglo-Australian Observatory (NGC1300), Chandra X-ray Observatory (Bullet cluster), D. Clowe et al (Bullet cluster with sur-imposed weak-lensing reconstructions), Mullis et al (Galaxy Cluster XMMU J2235.3-2557), STScI/AURA (Hoag's object).

