IT IS NOT EASY TO REPLACE NEWTONIAN GRAVITATIONAL THEORY !

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1-The great amount of unseen dynamical matter in large scale structures is derived from: the Newton's law of inertia and the theory of gravitation.But none of these law has been tested on scale larger than r>10Kpc.It is then tempting to modify them following:

$$V = G\frac{m}{r}[\ 1 + \sum_i a_i \exp(-\frac{r}{r_i})]$$ Gibbons & Whiting, 1981; Sanders,1984 (1)

$$F = mag(\frac{a}{a_0})$$ Milgrom,1983 (2)

where g(x) is a phenomenological function.

2-We argue on both theoretical, observational and experimental grounds against the law(1).Up to now, we consider:

- **a non-relativistic theory with a single potential** as (1) exists only if $\sum a_i = -1$ (Gerbal &SirousseZia, 1987) which implies that there is **no gravitation at small scale** (for instance in the solar system!);
- **a** (massive) **Brans-Dicke-like theory:** $a_1 = 1/3$, $r_1 \leq 1$km (Fujii,1971,1974), which is too small compare to $r_1 \approx$20-40Kpc needed by Sanders(1984);
- **a quadratic Lagrangian theory:** or $\sum a_i = -1$ again (Stelle, 1978), or a false value for the light

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deflection(Teyssandier,1986) when $r_1 > 10^9$ km;

- **a SUper GravitY theory** (Scherk,1979)

based on the theory, experiments or observations yields : to $|a| \leq 10^{-2}$ (Mercury perihelion advance), to $|a| \leq 7.10^{-5}$ (Einstein redshift effect), to $|a| \leq 10^{-9}$ (Eötvös experiment) (Goldman, 1986), which are too small compare to $a \approx -0.9$ needed by Sanders.

3-It does not mean that every possible theories have been considered; however each new exhibited theory must satisfied severe criteria (Will, 1981; Sanders, 1986).Note that there is no cosmological model compatible with data in the frame of Bekenstein-Milgrom modified theory (Hansel & Jolicoeur, 1986).

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