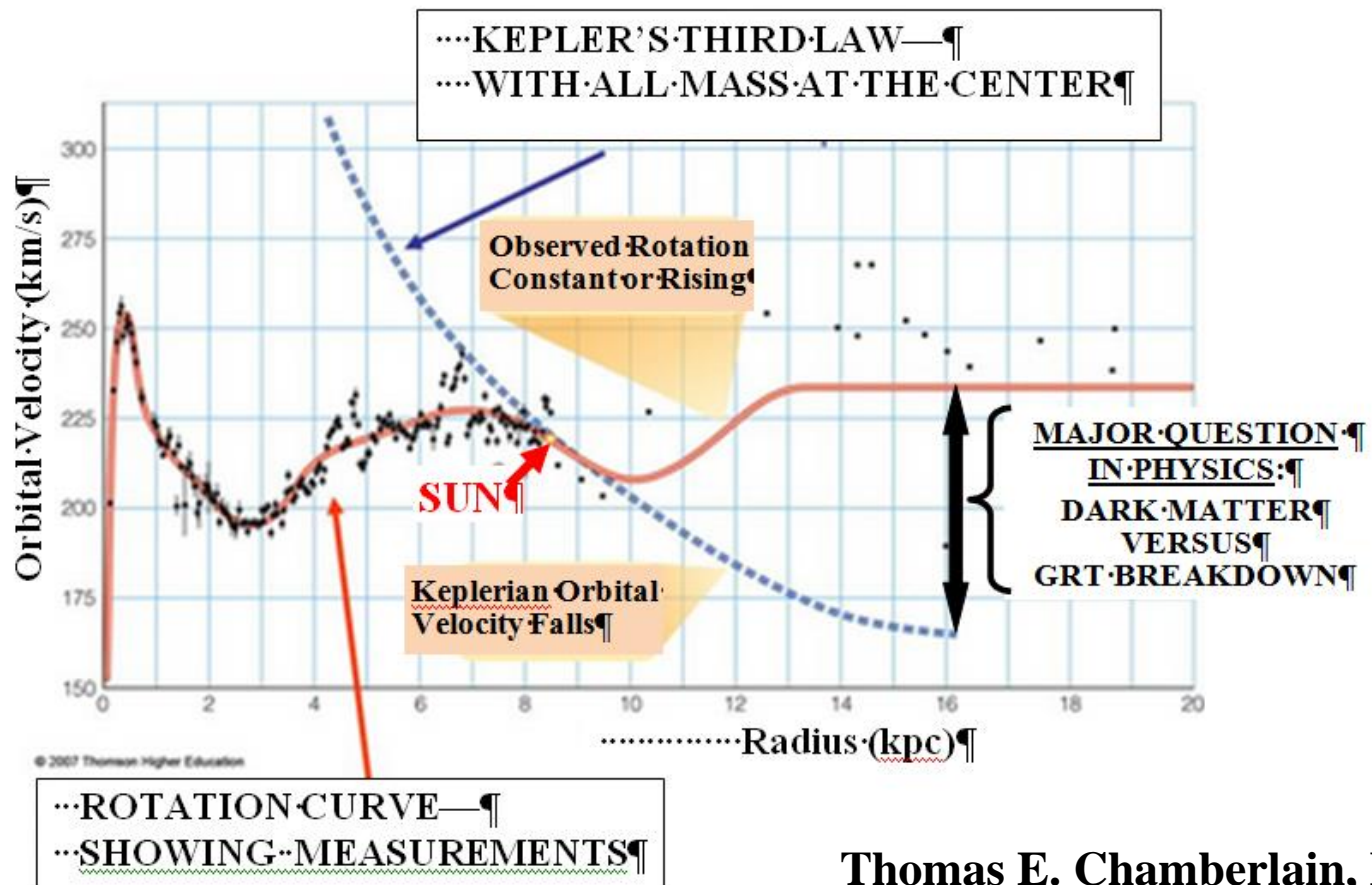


Revised Schwarzschild Solution To Accommodate Space Expansion



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22 June 2017

INTRODUCTORY COMMENTS

- **MORE THAN A NEW SOLUTION OF THE EINSTEIN EQUATIONS**
- **DEEPER THEORY OF SPACE-TIME AND GRAVITY**
- **BASED ON (One Way) INFINITE LIGHT-SPEED-----
IN THE HUBBLE FLOW**
- **JUSTIFICATION : EXPLAINS SPIRAL-GALAXY
ROTATION FLATTENING**

SAME MOTION ACCELERATION/SYNCHRONY

- **BASIS FOR GRT AND THE PRESENT DEEPER THEORY**
- **INVENTED BY EINSTEIN (1907)**
(Albert Einstein, Principle of Relativity and Gravitation, 1907, p. 900)
- **INFINITE LIGHT SPEED DERIVED FROM SAME-MOTION PRINCIPLE**

OVERVIEW

- **SOME CONCEPTS**
- **SOME MATH**
- **THEORY COMPARISON WITH WIDE-BINARY STAR DATA
AND THE TULLY-FISHER RELATION**
- **CONCLUDING COMMENTS**

CONCEPTUAL ASPECTS

- **AFTER SAME-MOTION ACCELERATION----**
 - **DEPENDING ON HOW CLOCKS ARE SYNCHRONIZED**
BY THE MOVING OBSERVER (e.g., Moving at $\beta = 0.99$)
 - **MEASURED RODS CAN BE CONTRACTED OR EXTENDED**
 - **MEASURED CLOCK-TIMES CAN BE SLOWER OR FASTER**

(SEE: Chamberlain (2015))

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MATHEMATICAL DEVELOPMENT

GIVEN INFINITE LIGHT-SPEED (Inward)

FROM HUBBLE EXPANSION:

$$d\Delta t'/dt = -r_H H/c$$

FROM SCHWARZSCHILD SOLUTION:

$$d\Delta t'/dt = - (GM/rsc^2) + \dots$$

INDUCTIVE ADVANCES

SUB-FIELD TIME DILATION:

$$d\Delta t'/dt = - (GMcH)^{1/2}/c^2$$

SUB-FIELD GRAVITATION:

$$a = d([GM/R_s][R_0cH_0])^{1/2}/dr \\ = - 1/2 (GMcH)^{1/2}/r$$

NEW
RELATIVITY
PHYSICS

Agrees With
TULLY-FISHER RELATION
and
MILGROM'S DEEP-MOND

REVISED SCHWARZSCHILD SOLUTION

- **EINSTEIN FIELD EQUATIONS (EFEs):**

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

- **GIVING THE SCHWARZSCHILD SOLUTION:**

$$ds^2 = - \left(1 - 2GM/rc^2\right) c^2 dt^2 + \left(1 - 2GM/rc^2\right)^{-1} dr^2 + r^2 d\Omega^2$$

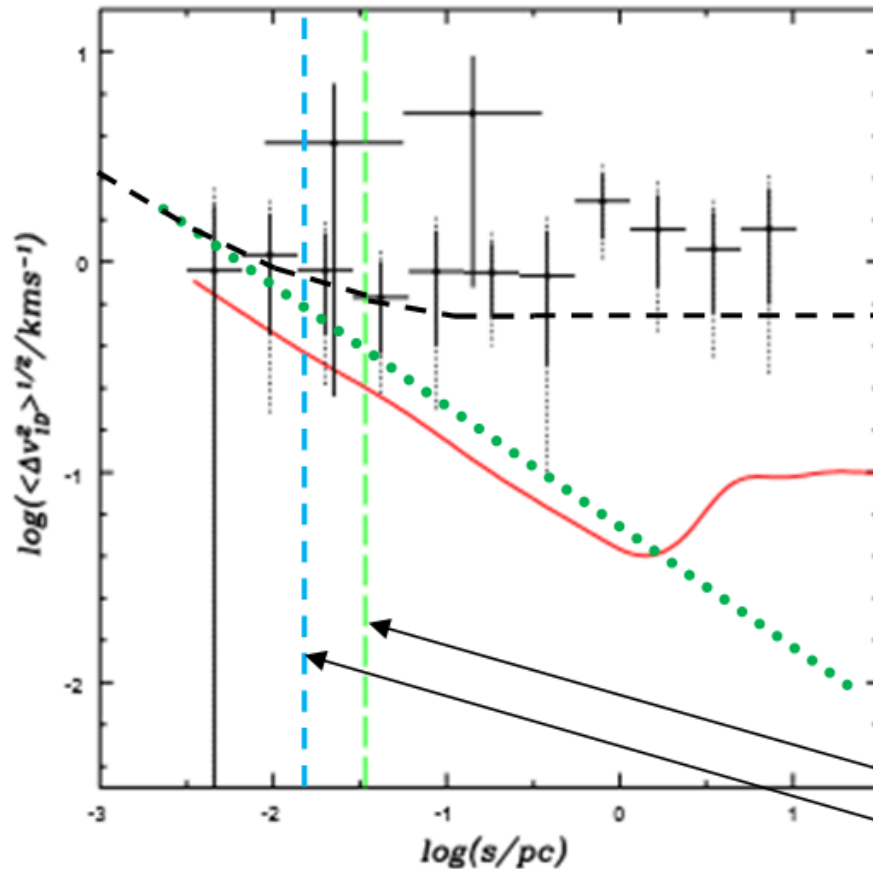
- **EFEs ARE AGAIN SOLVED FOR THE HUBBLE-EXPANSION “SUB-FIELD”:**

<u>Schwarzschild Solution</u>	<u>Sub-Field Adjustment</u>
$ds^2 = - \left(1 - 2GM/rc^2\right) c^2 dt^2 + \left(1 - 2GM/rc^2\right)^{-1} dr^2 + r^2 d\Omega^2$	$\bullet \left(1 - (GMcH)^{1/2}/c^2\right)^2$ $\bullet \left(1 - (GMcH)^{1/2}/c^2\right)^{-2}$

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THEORY VERSUS MEASUREMENT

WIDE-BINARY STAR GRAVITATIONAL CROSS-OVER



From Hernandez, et al. (2012). "Wide Binaries as a Critical Test of Classical Gravity".

Revised Schwarzschild solution assuming equal Solar masses, giving asymptote at 0.54 km/s

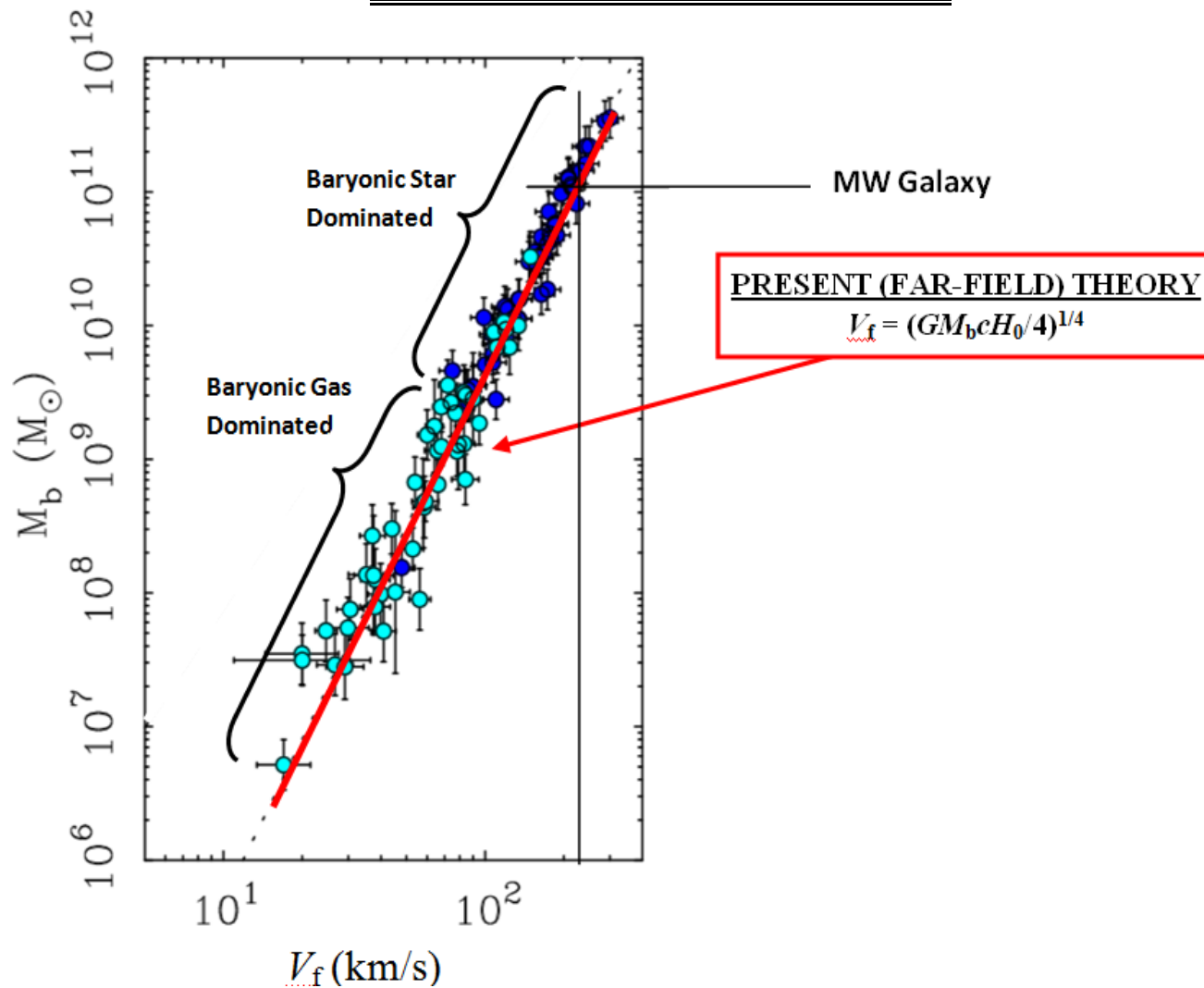
Binary relative velocity within the simulated Galaxy. (Jiang & Tremaine, 2009)

Kepler theory assuming equal Solar masses and exclusive of Galactic tidal effects.

- Newtonian gravitational acceleration at either star:
- Equals Milgrom's universal constant, a_0 ;
 - Equals cH_0 .

SPIRAL GALAXY FAR-FIELD ROTATION

TULLY-FISHER RELATION



CONCLUSIONS

- **NEAR-SINGULAR (INWARD) LIGHT-SPEED OPENS DOOR TO NEW PHYSICS**
- **IMMEDIATE BENEFIT IS A RELATIVISTIC EXPLANATION OF SPIRAL-GALAXY ROTATION FLATTENING**
(i.e., Within Hubble Space-Expansion)
- **A NEW RELATION EMERGES BETWEEN TIME AND MATTER/ENERGY**

SUB-FIELD TIME DILATION:

$$d\Delta t'/dt = - (GMcH)^{1/2}/c^2$$