Quantum Gravity
Galactic Mass Spectrum II

James G. Gilson j.g.gilson@qmul.ac.uk
School of Mathematical Sciences
Queen Mary University of London
Mile End Road London E14NS

August 25 2013

1 Abstract

A formula, derived from general relativity, is given that can be used to generate a cosmological mass spectrum. The spectrum values come out as kilograms and are determine by three arbitrary input parameters galactic epoch birth time, t_b, and structural mass ratios determined by, D and P.

Keywords: Dust Universe, Dark Energy, Dark Matter,
Newton's Gravitation Constant, Einstein's Cosmological Constant,
Cosmological Mass Spectra, Quantised Gravity, Black Holes

PACS Nos.: 98.80.-k, 98.80.Es, 98.80.Jk, 98.80.Qc

2 Introduction

This short note is a follow up of the paper [1] on the problem of formulating the equations that describes the equilibrium of a gaseous material in a self gravitational equilibrium condition in the galaxy modelling context and in the formulation of a quantum theory of gravity. This note only gives a greatly improved formula for the galactic mass spectrum obtained in that previous paper. A full derivation of this formula will follow later. I am presenting it now, without discussion, as it seems to me to be a very interesting and exciting result in astronomical physics.

3 Updated Galactic Mass Spectrum Formula

Galaxies are assumed to have two distinct mass constituents, a D part formed from Einstein's mass density and a P part formed from Einstein's extra pressure originated mass density, $3P/c^2$. These parts are further assumed to be formed from a D type and a P type black hole interior together with the their D type and P type exteriors respectively.

The quantized gravity spherical harmonic function parameters (l, m) relation with the usual atomic quantum angular momentum harmonic function parameters (l', m) can take a mass density form, D, and and a pressure form, P, identified with Einstein's general relativity pressure term as follows,

$$D: \quad l' = 2l - 1 \tag{3.1}$$
$$P: \quad l' = 2(2l - 1) \tag{3.2}$$
$$l_D = (l' + 1)/2 \tag{3.3}$$
$$l_P = (l' + 2)/4 \tag{3.4}$$
$$-l' \leq m_{D/P} \leq l'. \tag{3.5}$$

The mass spedtrum for a D type galaxy is given by

$$M_{l,m}(t_b, D) = \left(A(2l-1, m) + \frac{3A(2l-1, m)}{D}\right) \times \frac{R_\Lambda \sinh(3ct_b/(2R_\Lambda))c^2(4l-3)^{1/2}}{2G\theta_0^l(2l-1)^{2l}D^{1/2}} \tag{3.6}$$

The mass spectrum for a P type galaxy is given by

$$M_{l,m}(t_b, P) = \left(A(4l-2, m) + \frac{3A(4l-2, m)}{P}\right) \times \frac{R_\Lambda \sinh(3ct_b/(2R_\Lambda))c^2(8l-5)^{1/2}}{2G\theta_0^{2l-1/2}(2l-1)^{4l-1}P^{1/2}} \tag{3.7}$$

The combination of the two basics galaxy types just by addition gives the usual galaxy mass formation spectrum which involves both mass distribution types, $M_{l,m}(t_b, D, P)$,

$$M_{l,m}(t_b, D, P) = M_{l,m}(t_b, D) + M_{l,m}(t_b, P) \tag{3.8}$$

The ratio of the mass exterior to a galaxies black hole to the mass interior to the galaxies black hole for a D type galaxy is given by

$$R_D = \frac{3}{D}. \tag{3.9}$$

The ratio of the mass exterior to a galaxies black hole to the mass interior to the galaxies black hole for a P type galaxy is given by

$$R_P = \frac{3}{P}. \tag{3.10}$$

The A function used above with its two arguments, is given for the D and P cases as respectively,

$$A(2l-1,m) = \frac{1}{\epsilon_m(4l-1)}\left(\frac{\Gamma(2l+m)}{\Gamma(2l-m)}\right) \tag{3.11}$$

$$A(4l-2,m) = \frac{1}{\epsilon_m(8l-3)}\left(\frac{\Gamma(4l-1+m)}{\Gamma(4l-1-m)}\right). \tag{3.12}$$

To print out a full galactic spectrum using the function $M_{l,m}(t_b, D, P)$ use the information above and assign definite numerical values to the galactic birth time, t_b and definite values to the two parameter D and P to select the ratio of mass excess of galaxy over black hole mass in the two type mass cases. A provisional value for θ_0 can be taken to be $\theta_0 = 2.97845$. The print out will contain as many spectral lines as determined by the top value of l for galaxies born at time t_b with the double black hole mass ratios R_D and R_P chosen.

Acknowledgements

I am greatly indebted to Professors Clive Kilmister and Wolfgang Rindler for help, encouragement and inspiration

References

[1] Gilson J. G., 2013, Galactic Classification
Quantum Gravity and Mass Spectra
A Cosmological Mass Spectrum each Galaxy
having a Quantized Black Hole Core Surface
Area Described as under the s p d f g h i... Atomic Symmetry Quantized
Gravity, June 30, 2013