Gravitational Frequencies of Extra-Solar Planets: *John Peter Grubert*

Introduction

In an abstract presented last year [1] it was shown that there is a gravitational pulse in space, which varies in the Solar System between 1.5 Hz and 1.8 Hz. This frequency causes the planets and their moons to vibrate in such a way as to create resonant or quantum orbits. It was also shown that the planets are all upheld in stable orbits caused by the gravitational radiation emitted by both the Sun and Jupiter. In fact, without the stabilizing influence of at least one Jupiter sized planet, stable planetary systems are probably not possible. This paper looks at eleven extra-solar planetary systems [2], two with three Jupiter sized planets, and the remainder with two. Present techniques that study the "wobble" of stars caused by planets orbiting around them can only detect very large Jupiter sized planets, even though small Earth type planets may also exist. Although the data being used is limited to a few Jupiter sized planets, it nevertheless gives useful results that verify that the theory applied previously on our own solar system [1] is applicable to other star systems.

In addition, the gravitational frequency of space inside very large planets is shown to increase with their mass, and become constant at about 1.95 Hz for planets greater than five times the mass of Jupiter. This data together with paradigms concerning the specific energy of space then allows the value of Hubble's constant to be verified in a new way.

Planetary Orbits

Since planets move in stable orbits around their star, the velocity of a planet creates a Doppler shift in the gravitational frequency of space v_g which locally "transforms away" the gravitational field. The planets own gravitational frequency Δv is given by this Doppler shift which is: $\Delta v = v_g u_p / c$ (1)
where the speed of light $c = 2.998\text{x}10^8$ m/s, and u_p = mean velocity of planet around the star.

Large Jupiter type planets have densities that allow them to vibrate elastically and emit more radiation than they receive from their star, thereby augmenting the star's gravitational radiation. This allows them to exercise significant control over the whole planetary system, especially the orbits of smaller outer planets beyond star quantum orbit 12.

Table 1 shows data for eleven extra-solar planetary systems each containing two or three known planets, where Mass = Jupiter mass of planet, r = mean radius of orbit, T = period, and u_p = mean velocity. Also given is the ratio between the planet's Δv and that of the main "Jupiter" planet's gravitational frequency Δv_j and the resonances n_j this creates. The planets must also be in resonant or quantized orbits with respect to their star because only then can they exchange gravitational energy with the star without losses. These quantum positions n_s are also shown in Table 1, and are computed from Eq. 2, which is derived in [1], plus the Δv from Eq. 1, which is: $\Delta v = n_s\, c / (8\, \pi^2 r)$ (2)

Calculations are started by guessing the quantum number of the innermost planet with respect to the star (n_s) then computing Δv from Eq. 2, and v_g from Eq. 1. If v_g is between 1.6 Hz and 2.0 Hz, then n_s is probably correct, and the ratio between its frequency and the "Jupiter" planet frequency can then be guessed. When a whole quantum number n_j has been assigned to each planet, and they all have gravitational frequencies v_g between 1.6 Hz and 2.0 Hz, then the other planet or planets quantum number with respect to the star n_s is computed from Eq. 2. If these numbers are very close to whole numbers then the quantum numbers for that star system, with respect to both the star and the "Jupiter" planet are probably correct. It can be seen from Table 1 that both sets of quantum numbers have been found for all the planets with the exception of Gliese 876 c, its innermost planet. For this planet its star quantum number should have been $n_s = 1$, but was computed to be $(1\text{x}2)^{1/2}$, which suggests that it is locked into the $n_s = 2$ vibration mode of its companion.

Gravitational Frequency and Mass of Jupiter Sized Planets

If the gravitational frequency of space v_g at each of these extra-solar planets is plotted against its Jupiter mass, then the resulting figure, not included, clearly shows that there is a direct relationship between v_g and the mass of a Jupiter sized planet, with the frequency reaching a maximum of 1.95 ± 0.02 Hz when the planet's mass is greater than five Jupiter masses. This result implies that all stars must also have a gravitational frequency v_g of about 1.95 Hz.

Hydrodynamic Analogy of Space

Some scientists believe that our universe consists mainly of virtual particles, creating what is called the quantum vacuum or the zero-point-field. These virtual particles are thought to interact with charged fundamental particles in real matter creating both gravitational and electromagnetic vibrations at specific resonant frequencies. In some ways the expanding universe is similar to the flow from a collapsed dam. The specific energy of the flow E is equal to the sum of its potential or pressure energy PE, which drives the expansion of the universe, and its kinetic energy KE. Eventually, the flow stabilizes near the point of minimum specific energy, where flow conditions are critical, just like a real fluid when there is no downstream control or like a trained neural network. Our visible galaxies are just in the subcritical part of the flow, further out the critical section is reached where the PE = $2/3E_{min}$ and the KE = $1/3E_{min}$.

In fluid mechanics, for a "wide" channel and constant discharge, this critical section is where E is a minimum. Here the PE = $h_c = 2/3E_{min}$ the KE = $u_c^2/2g = 1/3E_{min}$ and the Froude number F=1 where F = Inertial force / Gravity force, that is $F^2 = u^2/gh$ = 2KE/PE, where h = depth of water, u = velocity of water, and g = gravitational acceleration.

Specific Energy and Density of Space

The total average specific energy density of space consists of two parts, a potential, pressure or vacuum density ρ_v and a kinetic or matter density ρ_m. Because space is almost flat they add up to the critical density ρ_c and on average deep space consists of $\rho_v = 0.70\ \rho_c$ and $\rho_m = 0.30\ \rho_c$. The dark energy of ρ_v originates from unknown virtual particles forming the zero-point or quantum field known as quintessence. The energy of ρ_m includes 15% ordinary visible and dark matter, and 85% unknown exotic dark matter. Hence, $\rho_c = \rho_v + \rho_m$ where ρ_c E, ρ_v h, ρ_m $u^2/2g$, and F^2 $2\rho_m / \rho_v$.

Hubble's Constant and the Gravitational Frequency in Deep Space

The critical density $\rho_c = 3H^2/(8\pi G)$, and $G = \xi v_g^2/\rho_v$ where H = Hubble's constant, G = Newton's gravitational constant, and ξ is a dimensionless electrostatic/gravitational constant defined by Grubert [1] and equal to $1.75\mathrm{x}10^{-37}$.
Since $\rho_c = \rho_v + \rho_m$ we obtain Eq. 3: $\rho_m / \rho_v = [\ (0.682 \times 10^{36} \times H^2/v_g^2\ ) - 1\ ]$ (3)
Inside stars v_g=1.95±0.02Hz and $\rho_m = 0$, since all their specific energy is potential, hence from Eq. 3, H=2.36±0.02x10^{-18} s^{-1}or 72.8±0.7 (km/s)/Mpc, which agrees with recent measurements. In deep space $\rho_m / \rho_v = 3/7$, $F = (\ 6/7)^{1/2} = 0.93$, which is just subcritical, and Eq. 3 gives v_g=1.63 Hz. At the critical section where F=1, the gravitational frequency is 1.59 Hz.

References

[1] Grubert, J.P. (2003), 34th L&PS Conf., paper#1168. (http://www.lpi.usra.edu/meetings/lpsc2003/pdf/1168.pdf)
[2] Extra-solar Planets Catalog, updated 11/12/2003 by Jean Schneider. (http://www.obspm.fr/encycl/cat1.html)

Table 1. Extra-solar Planetary Resonances.

Planet	Mass (J)	r x10^9 (m)	T (days)	u_p x 10^3 (m/s)	v_g (Hz)	Δvx10^{-4} (Hz)	$\Delta v_j / \Delta v$	n_j	n_s
Ups And b	0.69	8.90	4.617	139	1.84	8.53	1/6	1	2.00
Ups And c	1.19	124	241.5	37.3	1.71	2.13	2/3	4	6.96
Ups And d	3.75	378	1284	21.4	1.97	1.42	1	6	14.1
55 Cnc b	0.84	16.4	14.65	81.4	1.71	4.64	1/6	2	2.00
55 Cnc c	0.21	35.9	44.28	59.0	1.57	3.09	1/4	3	2.92
55 Cnc d	4.05	883	5360	12.0	1.93	0.773	1	12	17.96
HD38529 b	0.78	19.30	14.309	98.1	1.81	5.91	1/5	1	3.00
HD38529 c	12.70	551	2174.3	18.4	1.92	1.18	1	5	17.1
Gliese876 c	0.56	19.4	30.1	46.9	1.77	2.77	7/8	7	1.415
Gliese876 b	1.98	31.4	61.02	37.4	1.94	2.42	1	8	2.00
HD74156 b	1.86	44	51.64	58.2	1.78	3.45	1/3	1	4.00
HD74156 c	>6.17	500	2055	17.7	1.95	1.15	1	3	15.1
HD168443 b	7.7	43.4	58.116	54.3	1.93	3.50	1/3	1	4.00
HD168443 c	16.9	426	1739.5	17.8	1.97	1.17	1	3	13.1
HD37124 b	0.75	80.8	152.4	38.6	1.83	2.35	3/7	3	5.00
HD37124 c	1.2	374	1495	18.2	1.68	1.01	1	7	9.94
HD82943 b	0.88	109	221.6	35.8	1.75	2.09	5/6	5	6.00
HD82943 c	1.63	174	444.6	28.5	1.83	1.74	1	6	7.97
HD169830 b	2.88	121	225.62	39.0	1.93	2.51	1/2	1	8.00
HD169830 c	4.04	510	1950	19.0	1.97	1.25	1	2	16.8
HD12661 b	2.30	124	263.6	34.2	1.89	2.15	1	5	7.00
HD12661 c	1.57	383	1444.5	19.3	1.85	1.19	9/5	9	12.0
47 Uma b	2.41	314	1095	20.9	1.91	1.33	1	2	11.00
47 Uma c	0.76	558	2594	15.6	1.70	0.887	3/2	3	13.04