1) 88(1):

Spin Connection Resonance in the Newton Equation and the Bound Orbit.

Reference: M. W. Evans, Acta Phys. Pol. B, 38, 2211 (2007), "SCR in Gravitational General Relativity".

In eqn. (63) of this paper it was shown that SCR enters Newtonian gravitational theory through:

$$\frac{d^2\underline{\Phi}}{dr^2} - \frac{1}{r}\frac{d\underline{\Phi}}{dr} + \frac{1}{r^2}\underline{\Phi} = -J^{(0)} \quad -(1)$$

where $\underline{\Phi}$ is the gravitational potential, and where $J^{(0)}$ is defined in paper 55:

$$\underline{\nabla}\cdot\underline{R}(\text{vital}) = J^{(0)} \quad -(2)$$

The classical Newton equation is:

$$\underline{F}(\text{classical}) = -m_1 m_2 G \underline{\nabla}\underline{\Phi} \quad -(3)$$

and the ECE equivalent is:

$$\underline{F}(\text{relativistic}) = -m_1 m_2 G\left(\underline{\nabla} + \underline{\omega}\right)\underline{\Phi} \quad -(4)$$

where $\underline{\omega}$ is the spin connection vector. The

2)

Newtonian limit of eq. (4) is the off resonance condition:

$$\underline{\nabla}\,\underline{\Phi} = \underline{\omega}\,\underline{\Phi} \quad -(5)$$

with gravitational potential:

$$\underline{\Phi} = -\frac{1}{r}. \quad -(6)$$

The spin connection vector is:

$$\underline{\omega} = -\frac{1}{r}\,\underline{e}_r \quad -(7)$$

where $\underline{e}_r$ is the radial unit vector.

Therefore:

$$\underline{\nabla}\,\underline{\Phi} = \underline{\omega}\,\underline{\Phi} = \frac{1}{r^2}\,\underline{e}_r \quad -(8)$$

$$\underline{R}\,(\text{orbital}) = -\frac{2}{r^2}\,\underline{e}_r. \quad -(9)$$

In this condition, eq. (2) gives:

$$\boxed{J^{(0)} = \frac{d}{dr}\left(-\frac{2}{r^2}\right) = \frac{4}{r^3}} \quad -(10)$$

Resonance can occur if $J^{(0)}$ has an oscillatory nature, e.g.

$$J^{(0)} = J^{(0)}(0)\cos(\kappa r) \quad -(11)$$

The Newtonian limit of eq. (10) does not have an oscillatory driving term.

3)

However, it is conceivable that an oscillating driving term may occur in highly gravitating systems on the macroscopic scale, or in the interaction of nuclear particles on the microscopic scale. The Brownian motion is an intermediate scale, it was originally discovered as the motion of pollen particles. In 1905 Einstein showed that it was due to the existence of molecules. To do this he used a diffusion equation similar to eqn. (1) in structure. This theory was later developed by Smoluchowski and Kramers, who gave equations similar in structure to the Schrödinger equation. The theory of the Brownian motion was also developed by Langevin, and later by Kubo and Mori. It was adapted by Evans et al. to explain the far infra-red in terms of molecular dynamics.

If a link can be forged between these two known equations and eqn. (1), new types of resonances may be found in molecular dynamics, all fields, and these resonances may be linked to the theory of resonant gravitation.