Journal of Physical Science and Environmental Studies
Vol. 2 (1), pp. 1-5, April, 2016
ISSN 2467-8775
Review
http://pearlresearchjournals.org/journals/jpses/index.html

Cosmos Dynamics and Motion

Jelenka Savkovic-Stevanovic

Accepted 15 January, 2016

Faculty of Technology and Metallurgy Belgrade University, Karnegijeva 4, 11000, Beograd, Serbia. E-mail: stevanoviccace@gmail.com.

ABSTRACT

In this paper, the cosmic ray waves were considered and stars motion was examined. General entities distribution and motions equations for different situations and conditions were analyzed. The obtained results show the stars motion, universe expansion and entity motion. These expressions was derived in microscopic and macroscopic levels for material, momentum and energy transfer and the particles expansion in atmosphere free and forced moving are happened. Cosmos expansion and acceleration were considered.

Key words: Cosmic ray waves, stars motion, dynamics, entity, parameters.

ABBREVIATIONS: CMB-Cosmological Measurement burst, GRB-Gamma ray bursts, SNAP-Super Nova Acceleration Probe and UV-Ultra-violet radiation.

NOTATION: c *-concentration, kg/m*^{3}*,* c_v *-heat capacity at constant volume, J/g,* c_p *-heat capacity at constant pressure,J/g,* D *- diffusivity parameter, m/s,* E *-inner energy, J,* F *-force of mountain obstacle, N*
F_G - some generation external force, N, f - gravitation constant , $f = 6.670 \cdot 10^{-8}$, cm^{3}g^{-1}s^{-2}, g *- gravity, m/s*^{2}*,* P – *pressure*, *Pa* , Q -external energy, J, q_o -currently acceleration, t -time, s, t_0 -universe age, s, S_R -sun radiation energy, J/s, T -temperature, K and z -distance, m.

GREEK LETTERS: *α*-acceleration, m/s^2, ε -total energy,J , Ω_o -cosmological constant, ψ -distribution function and ρ -density, kg/m^3.

SUBSCRIPT: i -entity and x, y, z -spatial coordinate.

INTRODUCTION

Our milk galaxy belongs of the group spiral galaxies. It seems to a disk which rotary moving. Physics recognizes a startling new revelation in our understanding of the cosmos. Based on measurements from the last 15 years, now it is known that the expansion of our Universe is not slowing, as was believed since the Big Bang theory first emerged, but that its expansion is actually accelerating. This acceleration has been the dominant force in the cosmos since our universe was about half its current age. This discovery also provides additional insights into Einstein's theory of general relativity, a cornerstone of physics and our understanding of the universe. So this discovery not only helps us understand the evolution of the universe, but it also gives us new insights into how it

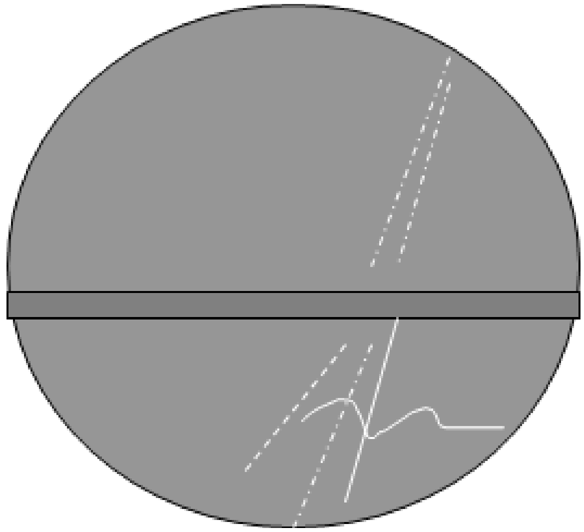

Figure 1. Cosmic rays effect in solid material.

may end. It shows science at its best, where a startling discovery was made and confirmed by two independent teams. According to the results that the expansion of the Universe itself is accelerating, surprised many scientists given that astronomers previously believed that the expansion of the universe would slow down and eventually reverse, leading to a so-called "Big Crunch" a violent end in which the universe would collapse into a singularity.

General equations for universe expansion rate (Savkovic-Stevanovic, 2013a, b). Sky entity motion was studied (Savkovic-Stevanovic, 2011a, 2013c). Dispersion models of small entities can develop from microscopic consideration based on assumption that flow consists of many number of smaller fluctuation of dependent variables. However, in base dispersion models are used because of their successful representation of the real transfer processes. Dispersion type of description is always good for some local zone of mixing and turbulences.

This category of problems can be treated alternatively by concept of material, energy and momentum transport. These models can be derived in microscopic and macroscopic levels for material, moment and energy transport. The researchers used measurements of a particular type of supernova, called type Ia, to measure the expansion rate of the universe over time (Price and Schmidt, 2004; Perlmutter and Riess, 1999; Perlmutter,2001). Taken together, these results provide compelling evidence that the ideas about the way the universe works are valid. In this paper cosmos dynamics and motion were studied.

COSMIC RAYS

If the progenitors of gamma-ray bursts (GRBs) are massive stars, then we expect the GRB rate to follow the cosmic star formation rate at least to moderate redshifts (Price and Schmidt, 2004; Perlmutter and Riess, 1999; Perlmutter,2001). Need to quantify selection effects in the measurement of GRB redshifts as a function of the GRB energy release, afterglow luminosity and redshift. Applying these to a sample of 24 GRBs with optical afterglows and measured redshifts, and present the resultant measurement of the GRB rate. The GRB rate density evolution is consistent with measurements of the UV luminosity density. The simulations predict that approximately 50% of searches for optical afterglows result in a non-detection, which is broadly consistent with the observed rate of “dark bursts”. Scientist are simulated to the case of the swift satellite mission and show that small robotic telescope projects may be able to identify γ 1 GRB beyond distance, z > 7 during the 3 year swift mission. This rate is largely limited by the relatively poor sensitivity in the near γ infrared, but may be increased if small telescopes are coupled with more sensitive imaging in order to uncover a larger fraction of GRBs beyond the most distant known objects at z > 6.5. There are various ways of cosmic rays effect. Figure 1 shows one of them. Electrons number over plate is less and after passing through the plate is much more.

The recent supernova measurements of cosmological acceleration, together with the CMB and galaxy cluster measurements, raise new important questions: Do we have a reliable, consistent picture of cosmology? What is the identity of the previously unknown energy that is causing the acceleration? To address these questions, Perlmutter and Riess (1999) have designing a new supernova experiment using a satellite with a telescope (called “SNAP,” for Super Nova/Acceleration Probe). The goal of this project is to measure the expansion history of the universe at a 1 to 2% level of precision. The various theories of the accelerating energy predict different histories of decelerations and accelerations in the universe. Measurements of type Ia supernova apparent brightness’s over a range of distances allows a measurement of changes in the universe’s expansion rate. This measurement yields information about the mass density and vacuum energy density (“cosmological constant”) of the universe. There are results from two research groups that are in excellent agreement. Both groups’ results indicated with high statistical confidence that the universe is currently accelerating (q_0<0) and that the cosmological constant (Ω_Λ) makes an important contribution to the total energy density. It was discussed in literature, the techniques involved in these measurements, and the systematic uncertainties due to supernova evolution, gray extinction, weak lensing, selection bias, sample contamination, a local void, and methodology. To date, none of the sources of systematic uncertainty that have been identified and estimated can reconcile the data with $\Omega_\Lambda = 0$ and q_0>0.

STARS MOTION

Gases moving which making stars may be observed based on gravitation Newton’s law. For moving gas only radial moving in sphere symmetry form is considered. These stars moving are described by the following equation:

$$\frac{\partial\rho}{\partial t}+\frac{\partial\rho v}{\partial r}+\frac{2\rho v}{r}=0 \qquad (1)$$

Where ρ is density, v is radial velocity of the gas particles, r is sphere radius (distance to symmetry center), and t is time. If neglected gas viscosity, the following impulse equation including gravitation force is obtained:

$$\frac{\partial v}{\partial t}+v\frac{\partial v}{\partial r}+\frac{1}{\rho}\frac{\partial P}{\partial r}+\frac{fM}{r^2}=0 \qquad (2)$$

Where P is overall pressure (equal molecular and light pressure), f is gravity constant $f=6.670\cdot 10^{-8}\,cm^3g^{-1}s^{-2}$, M is gas mass inside the sphere whose radius r . M is defined as:

$$\frac{\partial M}{\partial t}=4\pi r^2\rho \qquad (3)$$

Temperature inside a star is very high cca 10^6 degree and star’s substance can be considered as ideal gas when pressure and temperature are high. Then, equation for energy in come flow in the star has written:

$$\frac{dE}{dt}+\frac{dA}{dt}=\frac{dQ}{dt} \qquad (4)$$

Where E is inner energy of the particles without inner potential gravitational energy, $\frac{dA}{dt}$ is work in time unit, and $\frac{dQ}{dt}$ is external heat in come in time unit. This equation can be transform in:

$$\frac{d}{dt}(c_vT)+P\frac{d}{dt}\frac{1}{\rho}=\varepsilon \qquad (5)$$

Where c_v is heat capacity at constant volume, dependent of substance chemical composition, and ε total energy which per unit time and unit gas mass. ε can be less or great from zero because of nuclear or chemical reactions. When gas star in equilibrium then follows:

$$\varepsilon=0 \qquad (6)$$

UNIVERSE EXPANSION

For the universe general motion consideration in space direction and time *t* the following equation can be derived:

$$\frac{\partial\rho}{\partial t}=v_x\frac{\partial v_x}{\partial x}+v_y\frac{\partial v_y}{\partial y}+v_z\frac{\partial v_z}{\partial z}- D\left(\frac{\partial^2 v_x}{\partial x^2}+\frac{\partial^2 v_y}{\partial y^2}+\frac{\partial^2 v_z}{\partial z^2}\right)+(-\mathrm{Re}_{fisie})+\mathrm{Re}_{fusie} \qquad (7)$$

Energy changes are described as:

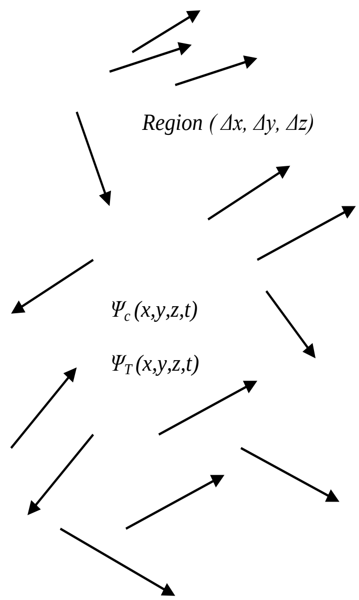

Figure 2. Local entity motion scheme.

$$\frac{\partial T}{\partial t} = v_x \frac{\partial T}{\partial x} + v_y \frac{\partial T}{\partial y} + v_z \frac{\partial T}{\partial z} - \lambda\left(\frac{\partial^2 T}{\partial x^2} + \frac{\partial^2 T}{\partial y^2} + \frac{\partial^2 T}{\partial z^2}\right) + (-\Delta H)(\mathrm{Re}_{fisie}) + \Delta H(\mathrm{Re}_{fusie}) \quad (8)$$

where *x, y* and *z* are geometrical space direction, v is velocity, ρ is density, D is diffusivity parameter, T is temperature, Re is reaction term, ΔH is heat reaction term, and λ is conductivity parameters.

ENTITY MOTION

Let consider in Solar system entities motion. In *x, y* and *z* direction and time *t* the following equation are derived: For x-direction,

$$\rho\left(\frac{\partial v_x}{\partial t} + v_x \frac{\partial v_x}{\partial x} + v_y \frac{\partial v_x}{\partial y} + v_z \frac{\partial v_x}{\partial z}\right) = -\frac{\partial P}{\partial x} + \varsigma\left(\frac{\partial^2 v_x}{\partial x^2} + \frac{\partial^2 v_x}{\partial y^2} + \frac{\partial^2 v_x}{\partial z^2}\right) + \rho g_x - \rho a_x - F_{Gx} \quad (9)$$

y- direction,

$$\rho\left(\frac{\partial v_y}{\partial t} + v_x \frac{\partial v_y}{\partial x} + v_y \frac{\partial v_y}{\partial y} + v_z \frac{\partial v_y}{\partial z}\right) = -\frac{\partial P}{\partial y} + \varsigma\left(\frac{\partial^2 v_y}{\partial x^2} + \frac{\partial^2 v_y}{\partial y^2} + \frac{\partial^2 v_y}{\partial z^2}\right) + \rho g_y - \rho a_y - F_{Gy} \quad (10)$$

and z -direction,

$$\rho\left(\frac{\partial v_z}{\partial t} + v_x \frac{\partial v_z}{\partial x} + v_y \frac{\partial v_z}{\partial y} + v_z \frac{\partial v_z}{\partial z}\right) = -\frac{\partial P}{\partial z} + \varsigma\left(\frac{\partial^2 v_z}{\partial x^2} + \frac{\partial^2 v_z}{\partial y^2} + \frac{\partial^2 v_z}{\partial z^2}\right) + \rho g_z - \rho a_z - F_{Gz} \quad (11)$$

Where ρ density, *v* is geometrical speed, *g* is gravity, earth acceleration force, α is sun acceleration force, F_G is some external generation force, *P* is pressure and ς is resistance factor. Let consider, local zone in the earth gravity field shown in Figure 2. There are three spatial independent variables and time: *x,y,z* and time *t*. At the particles expansion in atmosphere free and forced moving are happened. Dependent variables can be

considered entities concentrations and temperature.
Effects of gravity wind, raining, hail and the others can be included. Such as there are 3+m independent variables plus time which can be developed as 3+m dimension space. For arbitrary small space local zone is obtained: Material transport for considered entity,

$$\frac{\partial}{\partial x}(v_x c_i)+\frac{\partial}{\partial y}(v_y c_i)+\frac{\partial}{\partial z}(v_z c_i)+\sum_{1}^{m}\frac{\partial}{\partial \xi_i}(v_i c_i)- \frac{\partial}{\partial x}\ (\rho D_{ix}\frac{\partial}{\partial x}\frac{c_i}{\rho})+\frac{\partial}{\partial y}(\rho D_{ix}\frac{\partial}{\partial y}\frac{c_i}{\rho})+\frac{\partial}{\partial z}(\rho D_{ix}\frac{\partial}{\partial z}\frac{c_i}{\rho})= \frac{\partial c_i}{\partial t} \quad (12)$$

Where *v* geometrical velocity, *D* is diffusivity parameter, ρ is density and *t* is time. Assuming density is constant can be written:

$$\frac{\partial c_i}{\partial t}+v_x\frac{\partial c_i}{\partial x}+v_y\frac{\partial c_i}{\partial y}+v_z\frac{\partial c_i}{\partial z}+ =Def\,(\frac{\partial^2 c_i}{\partial x^2}+\frac{\partial^2 c_i}{\partial y^2}+\frac{\partial^2 c_i}{\partial z^2}) \quad (13)$$

For momentum transport, x-direction

$$\rho(\frac{\partial v_x}{\partial t}+v_x\frac{\partial v_x}{\partial x}+v_y\frac{\partial v_x}{\partial y}+v_z\frac{\partial v_x}{\partial z})=-\frac{\partial P}{\partial x}+ \mu(\frac{\partial^2 v_x}{\partial x^2}+\frac{\partial^2 v_x}{\partial y^2}+\frac{\partial^2 v_x}{\partial z^2})+\rho g_x \quad (14)$$

y-direction

$$\rho(\frac{\partial v_y}{\partial t}+v_x\frac{\partial v_y}{\partial x}+v_y\frac{\partial v_y}{\partial y}+v_z\frac{\partial v_y}{\partial z})=-\frac{\partial P}{\partial y}+ \mu(\frac{\partial^2 v_y}{\partial x^2}+\frac{\partial^2 v_y}{\partial y^2}+\frac{\partial^2 v_y}{\partial z^2})+\rho g_y \quad (15)$$

$$\rho(\frac{\partial v_z}{\partial t}+v_x\frac{\partial v_z}{\partial x}+v_y\frac{\partial v_z}{\partial y}+v_z\frac{\partial v_z}{\partial z})=-\frac{\partial P}{\partial z}+ \mu(\frac{\partial^2 v_z}{\partial x^2}+\frac{\partial^2 v_z}{\partial y^2}+\frac{\partial^2 v_z}{\partial z^2})+\rho g_z \quad (16)$$

Equations (14 to 16) define pressure changes, viscosity dispersion and gravity changes. Energy transport in zone,

$$\rho c_p(\frac{\partial T}{\partial t}+v_x\frac{\partial T}{\partial x}+v_y\frac{\partial T}{\partial y}+v_z\frac{\partial T}{\partial z}+ =\lambda(\frac{\partial^2 T}{\partial x^2}+\frac{\partial^2 T}{\partial y^2}+\frac{\partial^2 T}{\partial z^2}) +S_R \quad (17)$$

Where c_p is heat capacity, S_R (sun radiation energy), T is temperature, λ is conductivity, and ρ is density and *t* is time.

CONCLUSION

In this paper cosmos dynamics was analyzed and stars motion were derived. Cosmos expansion and acceleration were considered. Cosmic gamma ray bursts were pointed out. The derive functions in the general models for sky entities motion and particles distribution in atmosphere can be used for entities distribution prediction.

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