On pressure of fation gas

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1. Introduction.

According to the classical kinetic theory [1], pressure of gas on a closed container wall is equals to

$$p = \frac{2}{3}\varepsilon\,, \tag{1}$$

where ε is the gas energy density.

Here we give a derivation of the formula for the pressure of the perfect gas filling the infinite space. I have used this formula in [2] for pressure of the fation gas in the theory of the shadow-gravity. It is supposed that faion gas is the perfect gas, which consists of neutral sub-particles, free pass of which in the gas is very large. Ibid I also used the notion about fundamental sub-particles (*FSP*), from which all substance consists. I suggest to consider as fundamental such sub-particles, which are *absolutely impenetrable* for fations.

2. Derivation of a new expression

Let the fation gas flow, directed within limits of the element $d\Omega$ of the solid angle Ω, falls on the infinity small surface element, *ds*, of FSP (Fig. 1). The normal component of its momentum is equal to

$$dP = (2-\delta)(\varepsilon^*/c)V\cos\Omega_p d\Omega = (2-\delta)(\varepsilon^*/c)\cos^2\Omega_p a d\Omega ds\,, \tag{2}$$

where Ω_p is the plane angle, ε^* is the energy density of the uniformly directed flow of fations, δ is the probability of fation absorption by the body surface. $V = ads\cos\Omega_p$ is the volume of the oblique cylinder, *a=ct*, *t* is the time interval. Since *dP/t* is the element of force, *dF*, and dF/*ds*=*dp* is the element of pressure, we obtain from (2)

$$dp = (2-\delta)\varepsilon^*\cos^2\Omega_p d\Omega\,. \tag{3}$$

Solid angle Ω is equal to ratio of the spherical segment area, $S = 2\pi a^2(1-\cos\Omega_p)$, to a^2, i.e.

$$\Omega = \frac{S}{a^2} = 2\pi(1-\cos\Omega_p)\,. \tag{4}$$

By differentiating (4) with respect to Ω_p we obtain

$$d\Omega = 2\pi\sin\Omega_p d\Omega_p \tag{5}$$

After substituting (5) in (3) we find

$$dp = 2\pi(2-\delta)\varepsilon^*\sin\Omega_p\cos^2\Omega_p d\Omega_p\,. \tag{6}$$

Finally, after integrating (6), we obtain expression for pressure as

$$p = 2\pi(2-\delta)\varepsilon^*\int_0^{\pi/2}\sin\Omega_p\cos^2\Omega_p d\Omega_p = \frac{(2-\delta)\varepsilon}{2}\left(-\frac{\cos^3\Omega_p}{3}\right)\Bigg|_0^{\pi/2} \cong 1/3\varepsilon\,, \tag{7}$$

where $\varepsilon = 4\pi\varepsilon^*$ is the general energy density of the omnidirectional flows of fations. We also have taken into account that $\delta \sim 10^{-42} << 2$ [2].

As is seen, the new expression differs from that (1) obtained for the closed container.

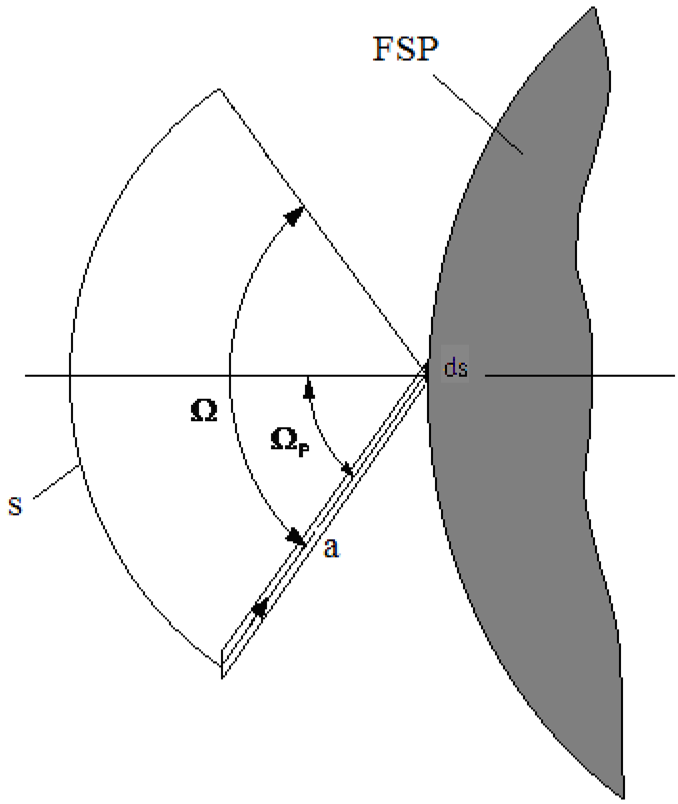

Fig. 1. Diagram of fations falling on the surface element, ds, of FSP.

References

[1] Reif, F. *Statistical Physics* (Berkeley Physics Course, New York, 1967), Vol. 5

[2] Nikolay V. Dibrov, "Exact Formula for Shadow-Gravity, Strong Gravity" (2013), **viXra.org e-Print archive, viXra:1309.0175,** Exact Formula **for ..**