Inverse electric-nuclear field

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Abstract. The electrically charged particles cause electrical induction of positive and negative units in the dynamic space, with result inverse electric fields are created. So, the nuclear force is interpreted as an electric force, 100 times stronger than the maximum electric force of the outer electric field that extends beyond the potential barrier. Moreover, the braking radiation emitted from rapidly moving electrons as they are passing close to the nucleus is confirmed.

Keywords: Electrical induction; electric units; inverse electric field; potential barrier.

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1. The electrically charged particles cause electrical induction of the dynamic space

By the unified theory[1,2] of dynamic space it is described the Genesis and structure of the neutron,[3] which accepts the effect of the Universal antigravity force,[4] that causes centrifugal accelerated motion towards areas of increasing cohesive pressure.[5] When the neutron is found in an environment of stronger cohesive pressure it becomes unstable and is cleaved (beta decay), producing a proton by the detachment of $\sim 10^6$ (Eq. 4) negative electrical units.[5] These negative units form an electron, while on the remaining proton cortex outmatch $\sim 10^6$ positive units and for the conservation of the system momentum an antineutrino[6] is created.

The positive charge of a proton causes the electrical induction of positive and negative units, creating electric or quantitative deformation of the proximal space, consisting of the repulsion of positive units and the attraction of negative ones. The result is the alteration of the background electric density ρ_0, which is the density of electric charge per length (Cb/m) of equal number of positive and negative units.

The alteration of the background electric density ρ_0 consists of displacement of positive and negative units, during which an excess of positive charge and at the same time a lack of equal amount of negative charge is created, which weaken with distance. We define by $\rho(+)$ and $\rho(-)$ the equal relative densities of positive or negative units per length, so the absolute value of electric density is

$$\rho_a = \rho_0 + \rho(+) \Rightarrow \rho_a = \rho_0 + \rho(-). \tag{1}$$

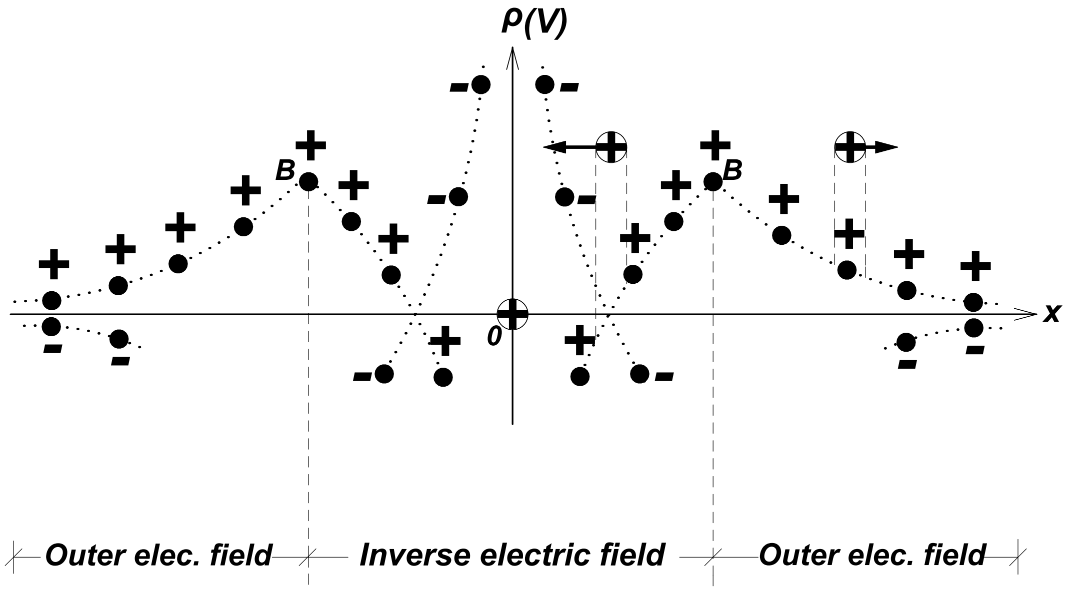

Figure 1. Inverse (inner) and outer electric field of proton ($\rho = e/x$, $V = K\rho$, where K is a ratio constant and B the potential barrier)

The proton (Fig. 1) with electric charge $+e$ is at position 0, where the background electric density ρ_0 of the positive and negative units was, while the axes represent the relative electric density ρ (it is proportional to the potential V of the electric field, Eq. 23) and the distance x. The top of the hill is the potential barrier B, internally of which the inverse (inner) electric field and externally the outer electric field are extended, whose the electric intensity (Eq. 15) declines until the distance $x \approx 10^6 m$ (Eq. 10). The relative electric density

$$\rho = \frac{e}{x} \tag{2}$$

of the outer electric field takes its minimum value at the above position $x \approx 10^6$m, where it is identical with the most elementary electric charge q of a unit ($q \equiv \rho$). Substituting the proton charge $e = 1,6 \cdot 10^{-19}$Cb[7] and $x \approx 10^6$m in Eq. 2, we have

$$q \equiv \rho = \frac{e}{x} \approx \frac{1,6 \cdot 10^{-19}}{10^6} = 1,6 \cdot 10^{-25} Cb \Rightarrow q \approx 1,6 \cdot 10^{-25} Cb, \tag{3}$$

that is the most elementary electric charge of the unit.[5]

So, from the neutron[8] a number of

$$\frac{e}{q} \approx \frac{1,6 \cdot 10^{-19}}{1,6 \cdot 10^{-25}} = 10^6 \Rightarrow \frac{e}{q} \approx 10^6 \tag{4}$$

negative units are detached (beta decay),[6] which structure the negative cortex of an electron.

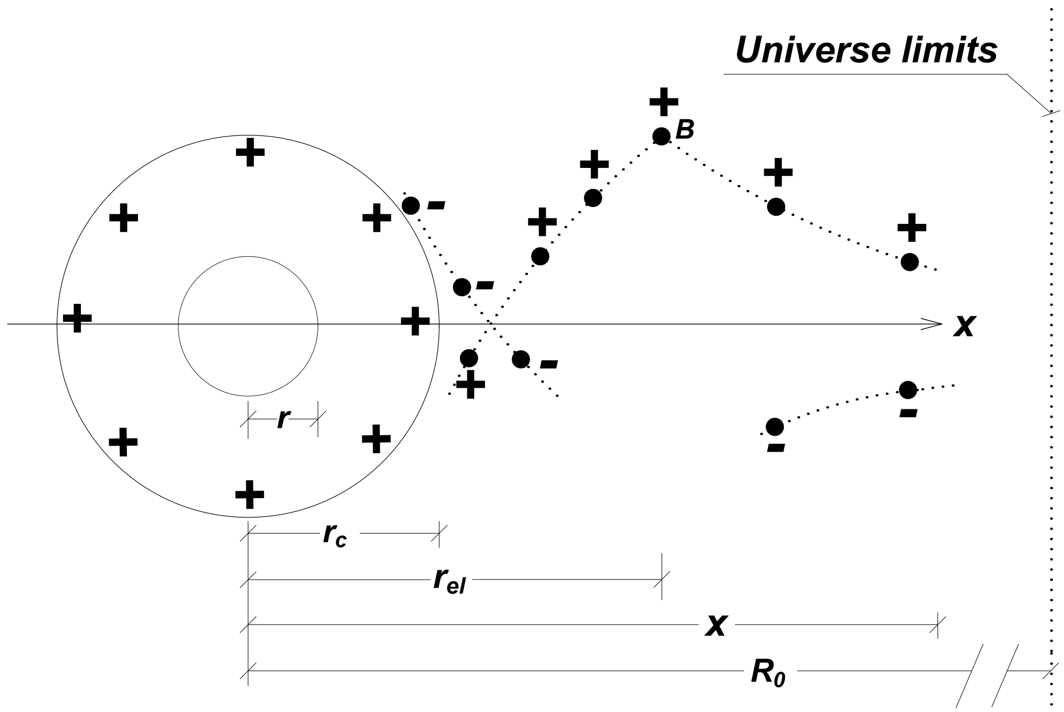

Figure 2. Radii are: r of proton's core vacuum, r_c of its cortex, r_{el} of its electric cortex (inverse electric field), R_0 of Universe and x is the extent of the outer electric field of a proton ($r \approx 10^{-54}$m, $r_c \approx 10^{-34}$m, $r_{el} \approx 10^{-14}$m, $x \approx 10^{6}$m, $R_0 \approx 10^{26}$m and B is the potential barrier)

The negative units ($\sim 10^6$) removed from the neutron are very few compared to the total number ($\sim 10^{58}$)[8] of its units. Therefore, we can consider the radius of a proton cortex of the same magnitude as that of a neutron, that is[8]

$$r_c \approx 10^{-34} m, \tag{5}$$

while its radius of core vacuum is[9]

$$r \approx 10^{-54} m, \tag{6}$$

whereby the size

$$\frac{r_c}{r} \approx \frac{10^{-34}}{10^{-54}} = 10^{20} \Rightarrow \frac{r_c}{r} \approx 10^{20} \tag{7}$$

is considered as the extent ratio of the space deformations. Namely, it is

$$\frac{r_c}{r} = \frac{r_{el}}{r_c} = \frac{x}{r_{el}} = \frac{R_0}{x} \approx 10^{20}, \tag{8}$$

wherein x is the extent of the outer electric field, r_{el} (Eq. 9) the radius of the electric cortex of a proton and R_0 (Eq. 11) the constant radius[1,2] of the Universe (Fig. 2).

Therefore, due to Eqs 8 and 5, the

$$\frac{r_{el}}{r_c} \approx 10^{20} \Rightarrow r_{el} \approx 10^{20} \cdot 10^{-34} = 10^{-14}m \Rightarrow r_{el} \approx 10^{-14}m \tag{9}$$

is the radius of the electric cortex of a proton (inverse electric field).

So, the extent of the outer electric field, due to Eqs 8 and 9, is

$$\frac{x}{r_{el}} \approx 10^{20} \Rightarrow x \approx 10^{20} \cdot 10^{-14} = 10^{6}m \Rightarrow x \approx 10^{6}m. \tag{10}$$

Similarly, due to Eqs 8 and 10, it is

$$\frac{R_0}{x} \approx 10^{20} \Rightarrow R_0 \approx 10^{20} \cdot 10^{6}m = 10^{26}m \Rightarrow R_0 \approx 10^{26}m, \tag{11}$$

i.e. equal to the magnitude of the constant radius of the Universe.

The radius of hydrogen nucleus is $\sim 10^{-14}$m,[7] namely it is equal to the radius of the electric cortex $r_{el} \approx 10^{-14}$m (Eq. 9) of a proton. Therefore, whatever is considered as indeterminate matter of quarks and gluons, it is defined by the unified theory of dynamic space as an electric cortex ($r_{el} \approx 10^{-14}$m) of a proton, into which there are strong electric (nuclear) attractive forces (see section 2). In this huge extent of proton's electric cortex many admirable phenomena[10] can occur.

2. Dynamics of inverse electric field - Nuclear force

In the outer electric field of a proton, which extends beyond the potential barrier (Fig. 1), the positive units outmatch the background electric density, while also equal is the reduction of the negative ones. There, a positive charge is repelled from the proton, due to the higher electric density of units on the proton side.

What happens, though, at the inverse electric field (Fig. 1 and 3)? On the left of B (Fig. 3) a positive charge is attracted by the proton, repelled more strongly by the units of higher electric density on the right of the positive charge, but less strongly by the units of lower electric density on the left of the positive charge ($\rho_2 < \rho_1$ hence $F_2 < F_1$, Eq. 12). Therefore, at the inverse electric field takes place the "paradox" that a positive charge is attracted by the positive proton, namely it there happens the opposite of what happens at the outer electric field, with result the homonyms are attracted and the oppositely charged particles are repelled. This is confirmed by the braking radiation emitted from rapidly moving electrons, as they are passing close to the nucleus and are not attracted from them but repelled, due to the inverse electric field and are slowing down by radiating.

So, we conclude that protons in the nucleus, due to the inverse electric-nuclear field, are not repelled but attracted. Therefore, the strong nuclear force[7] is not due to the presence of gluons, but it is the evident electric-nuclear force of the inverse electric field as a result of the fourth space deformation.

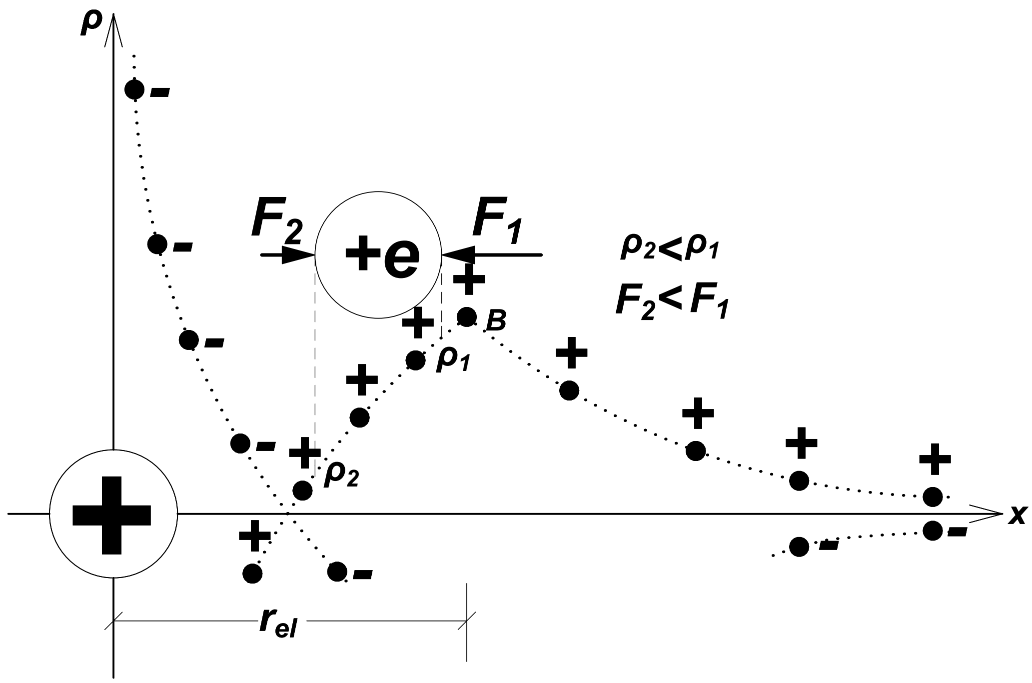

Figure 3. Attraction of a proton at the nuclear field, where B is the potential barrier ($F_1 = Ke\rho_1$, $F_2 = Ke\rho_2$, wherein $\rho_2 < \rho_1$ hence $F_2 < F_1$)

3. Electric field intensity - Coulomb's Law

If an electron A, with cortex diameter Δx and charge $-e$, is located at the outer electric field of another electron (Fig. 4), then electric forces between the units of electron cortex (A) and the units of that electric field are exercised.

As the relative electric densities ρ_1 and ρ_2 of units change equally (excess of negative or lack of positive charge) on either side of electron A, they are calculated twice ($2\rho_1$ and $2\rho_2$), exercising repulsive electric forces on the respective charge $e/2$ of electron A. Therefore, it is

$$F_1 = K\frac{e}{2}2\rho_1, F_2 = K\frac{e}{2}2\rho_2 \Rightarrow F_1 = Ke\rho_1, F_2 = Ke\rho_2 \tag{12}$$

with resultant of

$$F = F_1 - F_2 = Ke(\rho_1 - \rho_2) \Rightarrow F = Ke\Delta\rho, \tag{13}$$

where K is a ratio constant.

The Eq. 13 can written

$$F = Ke\Delta\rho \Rightarrow F = (K\Delta x)e\frac{\Delta\rho}{\Delta x} \Rightarrow F = K_c e\frac{\Delta\rho}{\Delta x}, \tag{14}$$

where $K_c = K\Delta x$ is the electric constant. Then, the electric field intensity is

$$E = \frac{F}{e} \Rightarrow E = K_c\frac{\Delta\rho}{\Delta x}. \tag{15}$$

The derivative as of x of the electric field density of an electron (Eq. 2) is

$$\rho = \frac{e}{x} \Rightarrow \frac{\Delta\rho}{\Delta x} = \frac{-e}{x^2}. \tag{16}$$

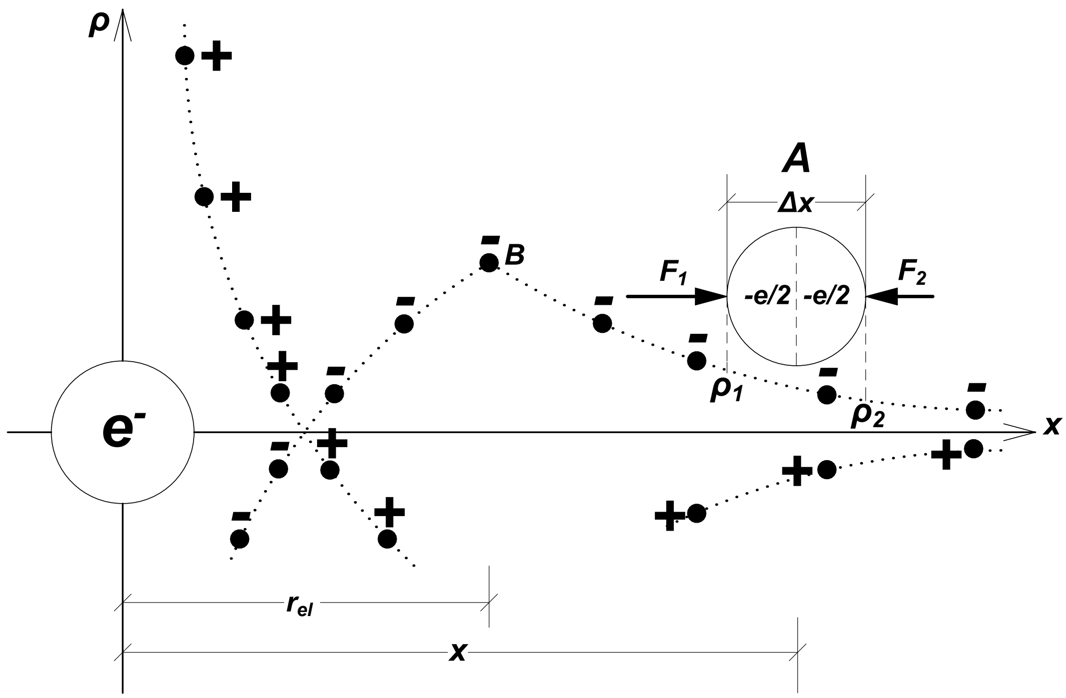

Figure 4. Repulsive electric forces between two electrons

So, due to Eq. 16, the Eq. 15 becomes

$$E = K_c \frac{e}{x^2}, \tag{17}$$

omitting sign (-), since on the outer and inverse electric field it is already defined how the electric charges are attracted or repelled.

We consider a positive charge Q_1 as a sum of n charges e, then the electric field intensity, due to Eq. 17, will be

$$E = K_c \frac{Q_1}{x^2}. \tag{18}$$

If at the above electric field a second positive charge Q_2 is placed, then the electric force F exercised on positive charge Q_2 will be

$$F = EQ_2 \Rightarrow F = K_c \frac{Q_1 Q_2}{x^2}, \tag{19}$$

which expresses the Coulomb's Law.

The maximum electric field intensity of the outer electric field at the potential barrier B for $x = r_{el}$, due to Eq. 17, is

$$E = K_c \frac{e}{x^2} \Rightarrow E = K_c \frac{e}{r_{el}^2}, \tag{20}$$

wherein $x = r_{el} \approx 10^{-14}$m (Eq. 9).

The electric field intensity, however, of the lower inverse nuclear field (section 4), for

$$x = \frac{r_{el}}{10}, \tag{21}$$

due to Eq. 17, is

$$E = K_c \frac{e}{x^2} \Rightarrow E = K_c \frac{e}{(r_{el}/10)^2} \Rightarrow E = 100 K_c \frac{e}{r_{el}^2}. \tag{22}$$

Comparing the two above electric field intensities of the outer ($E = K_c e/r_{el}^2$, Eq. 20) and inverse ($E = 100K_c e/r_{el}^2$, Eq. 22) electric field, we conclude that the nuclear force is 100 times stronger than the maximum electric force.

4. Potential V of nuclear field

In Fig. 5 the curve BC is symmetrical to the curve BM as of BA and therefore it is the continuity of hyperbole $\rho(+)$ of the outer field. Potential V of inverse electric-nuclear field is

$$V = K\rho(+) = K\rho(-), \tag{23}$$

namely it is proportional to the relative electric density $\rho(+)$ or $\rho(-)$ at point P and due to Eq. 2, is

$$V_P = (PZ) = K\frac{e}{x} \Rightarrow V_P = K\frac{e}{x}. \tag{24}$$

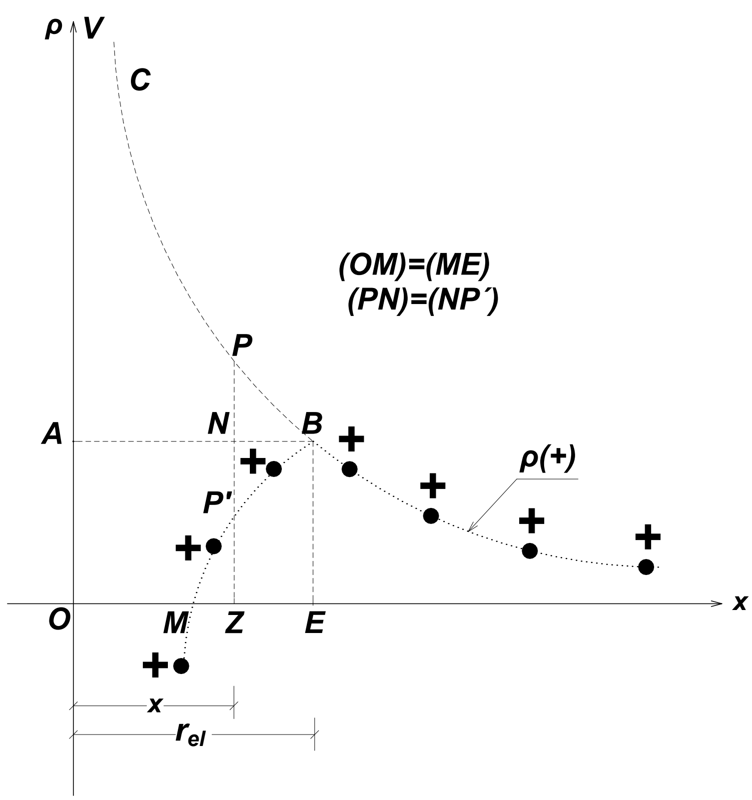

Figure 5. Potential V of the proton's inverse electric-nuclear field

At point B (potential barrier) the potential of inverse electric-nuclear field, for $x = r_{el}$ and due to Eq. 24, is

$$V_B = (BE) = (NZ) = K\frac{e}{x} = K\frac{e}{r_{el}} \Rightarrow V_B = K\frac{e}{r_{el}}, \tag{25}$$

wherein r_{el} is the radius of the electric cortex of a proton (inverse electric field), e its electric charge, x the distance from that proton and K a ratio constant.

Due to symmetry of the curves BC and BM, it is

$$(PN) = (NP'). \tag{26}$$

So, the potential P' of nuclear field is

$$V_{P'} = (NZ) - (NP') = (NZ) - [(PZ) - (NZ)] = 2(NZ) - (PZ) \tag{27}$$

and, due to Eqs 24 and 25, it is

$$V_{P'} = 2(NZ) - (PZ) = 2V_B - V_P \Rightarrow V_{P'} = 2V_B - V_P. \tag{28}$$

Therefore, the potential of inverse electric-nuclear field becomes

$$V = V_{P'} = 2V_B - V_P = 2K\frac{e}{r_{el}} - K\frac{e}{x} \Rightarrow V = 2K\frac{e}{r_{el}} - K\frac{e}{x}. \tag{29}$$

For $2Ke/r_{el} = Ke/x$ (Eq. 29), the potential at position

$$x = \frac{r_{el}}{2} \tag{30}$$

of nuclear field, namely at the middle M of the radius of electric cortex, becomes zero. For the interval between M and E the potential of nuclear field is positive, until its maximum value at B. Between O and M the potential of nuclear field is negative and takes very large values. Consequently, from M to E there exists the upper inverse electric-nuclear field and from M to O the lower one, where the increase of potential, in absolute value, is rapid.

If we replace in the Eq. 29 the proton charge e with the charge Ze of the nucleus and the radius r_{el} of the proton's electric cortex with the radius r of the nucleus, then the potential V of the electric-nuclear field becomes

$$V = 2K\frac{Ze}{r} - K\frac{Ze}{x}. \tag{31}$$

5. References

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