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# Curvature potential and Generalised Coloumb attraction into presumed heat development for a LED-tube

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**Abstract.** Desired heat development for a light chain is analysed and studied from an outside perspective. The idea for modeling is cumulative energy balance, such that thermal energy could be borrowed from EM and material configurations. Kinetics due curvature (in slow motion) and bifurcations in nonlinear models are deduced as potential transformers into beneficial heat. The results were negative for the present LED-tube, and traditional light sources are preferred.

**Keywords.** Heat radiator, electricity, constrained curvature, Newtonian gravity, coulomb attraction, traveling waves, nonlinear, heat sink.

## 1. Introduction

Transformations of Electromagnetism (EM) into quasi-static heat is present in many applications, e.g. convective velocities of the air. The netto-temperature in such climate becomes low, especially if distributed from the ceiling in portions with low thrust. Then, the warmer air moves upwards, (due to buoyancy). In addition, parcels, if continuing moving, may propeller themselves by lowering their temperature. This since attracted (gravitationally a la Newton) by e.g. a more dense human body, [1,2]. To obtain a comfortable living space, there is need for shields, etc.

In the present paper, models for how heat may develop in an electric lamp will be deduced. As in [3], the equations in continuum mechanics will be used as a point of departure. Herein, electric properties are considered as internal variables & temperature, angles and it derives as observables.

Since temperature is found to rise in curved lines, a generalised format of the Coulomb potential is scrutinized. Also, Newtonian gravity, referred to above, falls within this concept.

In conjunction with theory, designs where electric LED-lamps could provide heat are discussed.

## 2. Materials and Modeling

A test is made to obtain heat from EM in coverage and isolation, as in a LED-tube, Figure 1, or more with other shielding &/or small pendulum motions, [3]. It feels less warm than a small bulb lamp, however the area is larger and if/when heat diffuses towards colder areas or upwards, the resulting effect may be sufficient.

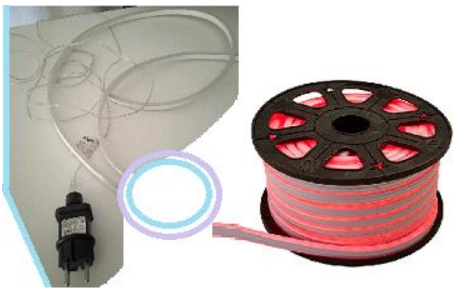

**Figure 1.** Left: An efficient heater realisation, would be it, if electrical input was distributed into more heat for a 6W-device. The roll at right is probably not permanently lighted, since such an arrangement with curved packed lines may cause overheat and fire [4], when laps.

### 2.1. Heat development at constrained expansion in a roll

Figure 1. The state is known to depend on curvature, temperature, EM-field and the angle m*2pi , where m is the number of laps.

*Remark.* The format gives a correlation between the temperature and pi.

### 2.2. Results

Tests for the original LED-tube, Figure 1, left, give that the cover temperature feels almost non-detectable increased, but the surrounding temperature is >0.1 C colder.

Since only red light is provided, possibly a heat sink occured since temperature is isotropic; a sum of contributions from the surrounding, and here most of the spectrum in the 'aether' light matter is missing.

A cosmologic response to a heat sink could be a structure with a certain density, compensating for the colours. In a room, there are other principles that level out such matter, however remaining in this case, is e.g. that observers only obtain the red light.

Due to the above results, the following prospective is for a lamp with heat radiating shield (e.g. ceramic-metal-elastomere-composite):

### 2.3. Energy balance at pendulum motion

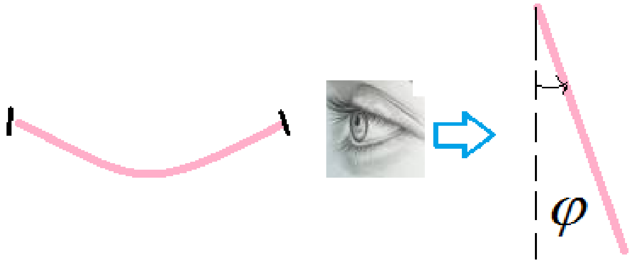


**Figure 2.** A lighted line in pendulum motion

Guided by the format in the energy equation, we consider a balance

$$T+V+T_E+E=\text{const}$$

where T and V are the kinetic and potential energy of a pendulum, $T_E$ is thermal energy and E is electric energy.

Considered as a Mathematical Pendulum, Figure 2, right, coupled with motion for other d.o.f e.g. axial and interior, the system is nonlinear, [5]. Since losses, there is need for a periodic input, (which may influence into harmonics). Here, we will assume the linearised pendulum together with an axial anomali as in a noncircular orbit [1,6]. Hereby, there are axial oscillations and the tube may collect and redistribute energy from axial deformation. (At Earth scale, that occur as tidal waves). However, in fact, also the surrounding angular velocity fields influences EM as observed in-field experiments [3].

With the geometry as in Figure 2, left, the matter is distributed perpendicular to the axis. Then, imagined oscillations will be distributed as a traveling wave along the LED-tube-line.

Primarily, temperature is raised by inside wear and change of interior pressures. The latter is probably due to that for an oscillating pressure, the temperature rises when pressure increases, but do not decrease as fast as the pressure. Observing that heat operates in pressurised spherical geometries, a solution is to shield with plexi-glass bulbs, Figure 3 (or other that suits with flexibility and the extra EM-field) .

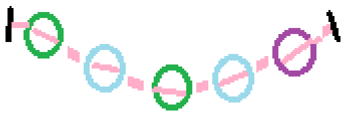

**Figure 3.** A design to extend and magnify the cover with e.g. bulbs, semi-air-tight connected such that the EM-oscillations give a pressure. It may be powered by hand or self-balanced by motion of room layers. Heated air moves e.g. upwards, and possibly, the resulting gravity action decreases (at least change), beneficially, to influence the oscillations, not only with damping.

## 3. Model and results for the Coulomb potential

This section adresses an extension of the potential relation for Coloumb attraction [7] (and/Newtonian gravity), in order to incorporate additional dependencies, e.g. heat energy in energy balance. Furthermore, differential calculus is applied on the format. It is shown that weighted differentiations preserve the structure but adds a constraint in terms of a relation for the parameters.

*Preliminaries.* The potential V(x) related to the force f(x), in Newtonian gravity and Coulomb attraction is modified to read

$$aV^2+V'=f(x) \tag{1}$$

where a is a parameter and V' denotes derivation dV/dx.

*Theorem 1*. With V=Q/x, Q being a parameter;

$$f=Q(aQ-1)/x^2 \tag{2}$$

Proof. Insertion in (1) and evaluation.

Remark. With traditional notation; $Q=q_1q_2/(4\pi\varepsilon_0)$ for electricity and GmM in gravity.

*Corollary 1*. Bounds for aQ. Preserving the structure V>0 and f<0 give bounds aQ-1<0. Figure 4 shows the region for

Q with this bound.

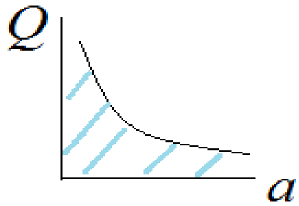


**Figure 4.** Q<1/a giving the range of Q for the values of a governing the nonlinear part in (1)

*Solution branch*: The new smaller force f, may determine a new potential in a classical linear relation f=dV/dx. Following a balance equation, the remaining modified potential energies can develop as heat and exterior electric field. Charged particles interact with both Coulomb and Newtonian potentials.

### 3.1. Weighted bilinear differentiation

*Preliminaries.* Equation (1) is rewritten and multiplied with x to read $x(f-aV^2)\,dx=xdV$ (3)

*Theorem 2.* Differentiation of (3), using the framework of differential geometry calculus [8] and (1) give V=1/(2ax) and $f=-1/(4ax^2)$

Proof. Differentiation of (3) gives xdf^dx- 2axVdV^dx=dx^dV where ^ is the wedge product [8]. Evaluation; df=f'dx^dx. Keeping V as a coordinate gives dV^dx nonzero. For the wedge product; dV^dx=-dx^dV; dx^dx=0. Hereby V=1/(2ax) QED. Insertion in (1) gives the force.

Corollary 2. Comparing with the preliminaries for V, V=Q/x, the parameter Q is now determined by a and f is 1/2 of the Coulomb (or Newtonian) force.

### 3.2. Bifurcations of gravity from an iteration format

Returning to the results in Theorem 1, we propose that f develops into the classical format f(Q), but at other distance $x_e$; $f=Q_e/x_e$. Insertion in (2) gives $Q_e=(x_e/x)^2Q(aQ-1)$. Multiplication with a, and constituting that $Q_e=Q_{n+1}$, $Q=Q_n$, (n being integers and $Q_n$ a sequence), gives the Logistic map, c.f. e.g. [6]. The solutions are given by fix points to the iteration map, and for $(x_e/x)^2>3$, there are bifurcations. Hereby, aQ will depend on the distance ratio. From the original map f(Qa), we may note that Qa achieves the same upper bound as given in Corollary 1.

*Remark*. The bifurcations may initiate kinematics and desired heat development on the EM-scale.

## 4. Conclusion

Applications in EM-configurations developing heat due to curvature, were emphasized.

Solutions for a normal radiating light source were proposed in Section 2.3, however the predictions from e.g. Corollary 2 reduce into one response when emphasizing an axially distribution. A macroscopic pendulum motion is periodic, and can act as Dirac-inputs to several smaller damped harmonic oscillators with higher frequency inside a tube. The frictional damping may result in increased temperature. With knowledge of electricity, the increased temperature may origin from other phenomena (being not exactly material friction e.g. wear, or thermal expansion and contraction (compression) of spherical cavities), however often, only the output is measurable and of importance.

For the resulting material, possibly a porous structure with low density is preferrable, since this requires less electric power to heat, and interior contacts (e.g. between cupper wires and plastic,) with motions are possible. Also, not kinematically constrained, such contacts appear self-balanced in electricity, and are determined by interior time-scales, non-input. These may be dangerous local short-cut-circuits; however, some heat is advantageous and occurs in many applications, e.g. at re-loading of batteries.

Most articles concern minimization of temperature for LEDs to increase lifetime, however the reverse may be extracted. The work in [9], relates temperature to colours. Other papers on mixed disciplines are found in [10,11]. Gravity causing rotation of a round mass with heterogenous mass distribution sketched in [1,2,10], may relate to charge masses, however experimental results at meso-scale, show how they also capture into polarised states and fast linear transfer by attraction.

Revisiting the balance equation in Section 2, it is general and not to control. Many systems polarise into stability and reduction of d.o.f, Figure 5. However e.g. heat and oscillations, are found to redistribute energy. For the LED tube, the small but fast oscillations at EM-scale providing interior heat are probably majority what we get; it does not increase room temperature, c.f. 2.2. Still, it may be a nonlocal energy reservoir for organisms responsive to a heat sink and corresponding unrevealed matter, Figure 6, (& the contact warming). Other light systems appear to achieve a varying interacting optimum operating temperature, where slow larger waves at room scale contribute desirably distributing heat.

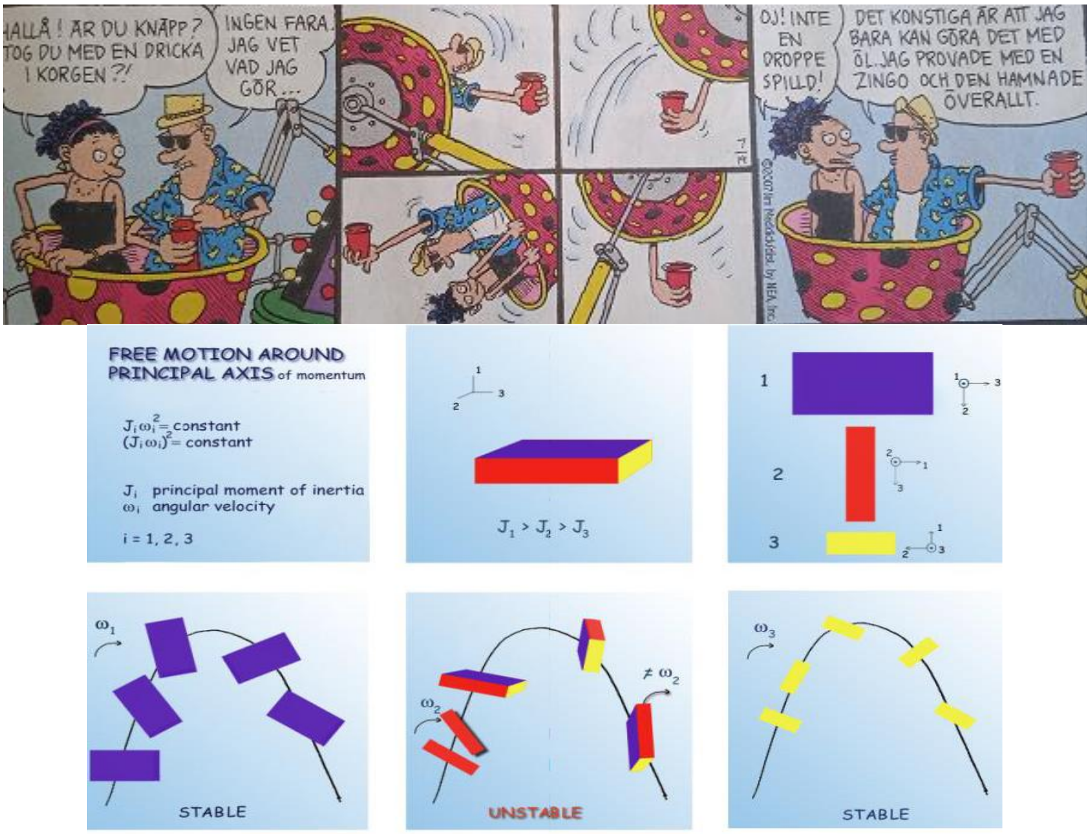


**Figure 5.** Matter in rotating systems

An analytic model, with a nonlinearity added to Coulomb attraction into a differential equation, were proposed. The results gave possible transfers between quasi-static states and dynamics. Other modeling on the subject is found in [12], with e.g. a 'velocity' w in the denominator as 1/(R(1-wR)), i.e. introducing both nonlocal, and dynamic dependency (so-called retarded times). Several inherited combinations, concepts and unknown forces in EM are discussed in [13, 14]. Shifts, relating imagined dynamics to a logistic map are given in [15]. In the frame of a lamp, the quasistatic temperature is constant after some minute, and linear models with damping may provide time-scales and describe the levels.

**Figure 6.** Ideas of structures for dark matter. At a heat sink due to a line distribution of red: 625-780nm, dense matter may compensate towards a blue shift.

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