Acceleration and separation of charged particles in alternating fields

The acceleration of charged particles is done with electric fields. This can be static electric fields (e.g. in linear accelerators or TV-tubes) or in alternating electric fields where one takes care that the phase in the acceleration segment is always such, that the acceleration is always in the same direction (e.g. betatron or synchrotron). One other method is the acceleration in waveguides, where the particles practially "ride" on a wave slope.

A further method is the acceleration in polarizing fields (not to be confused with polarized fields, where the word polarized is ment to be the orientation in space).

What is a polarizing field ?

It is a field combination of a quasistatic electric field (lets say in x-direction) with a perpendicular quasistatic magnetic field (then in y-direction) and with a time phase of plus or minus 90 degrees (1/2 pi). This is completely different to the electromagnetic waves in free space, where the electric and magnetic fields are in phase (time phase difference = 0).

It can be easily shown that in such a field combination free charges are first swinging according to the electric field, but due to the magnetic field they will be pushed always in the same z-direction at each half wave. The results is: **they are accelerated at each half wave in the same z-direction**.

A very inportent additional effect is, that opposit charged particles are accelerated into opposit directions on the z-axis. So such a field combination works not only as accelerating mechanismus, but also as **charge separating mechanism**. An important resulting fact is that in the universe the assumption of **fast recombination of electric charged particles is not given**. The universe is governed by gravity **and electric charges**.

The question is now, where are those polarizing fields in the universe ? This is quite simple, they are typically not homogeneous fields, but rotating electric and magnetic fields, caused by revolving charges. These rotating fields are polarizing, causing electric charges to be accelerated, protons and electrons into opposite directions. The resulting particle streams can be light years apart, so that a fast recombination is not possible.

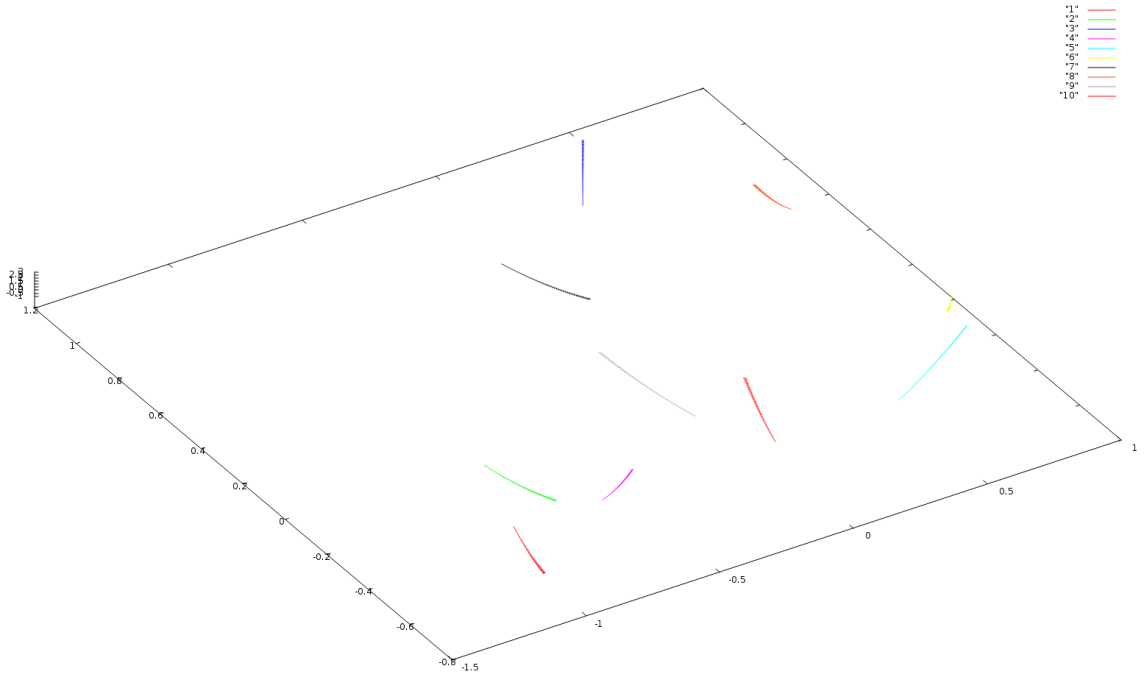
Discussions

- Neue Erklaerung fuer den 'impossible' EM-Drive http://www.physikerboard.de/topic,51020,-neue-erklaerung-fuer-den-impossible-em-drive.html
- New explanation for the EM-Drive / RF-resonant cavity thrust http://www.physicsdiscussionforum.org/new-explanation-for-the-em-drive-rf-resonant-cavity-thrust-t1199.html

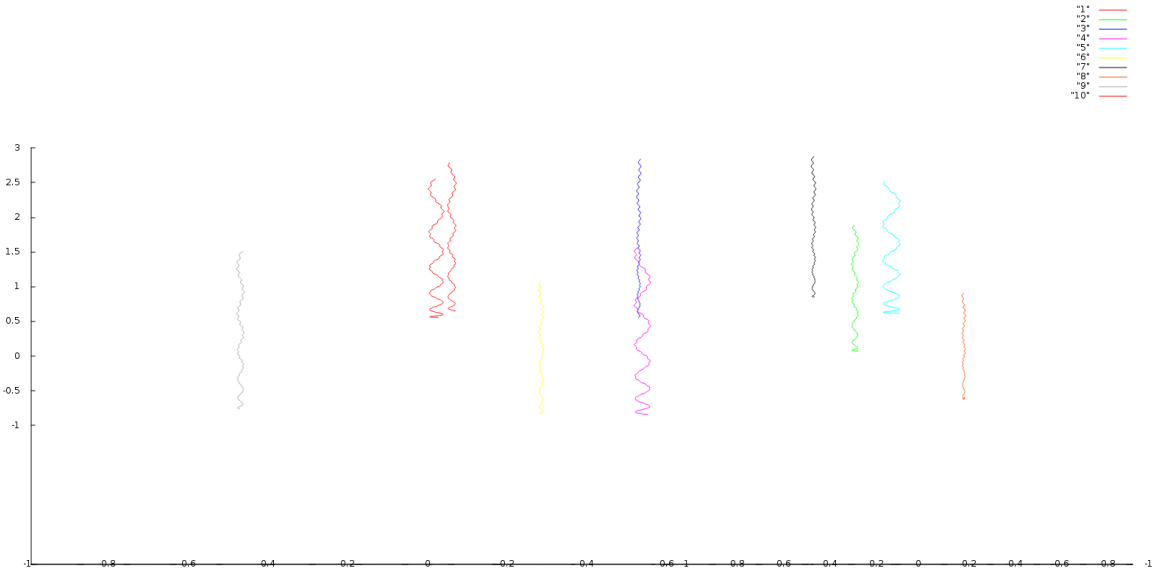
Simulations

Simple simulation with the described forces combined:

** right click on images and click 'open image in new tab' to view high resolution version*



The same simulation with a fixed magnetic field only in z-direction added to force the electrons on a circular pathway:

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Simulate yourself!

Download our free Particle Movement Simulator from GitHub: https://github.com/kechel/ParticleMovementSimulator

The try above simulations yourself and/or play with the settings as you like.

The above 2 Simulations are stored in the following 2 files:

https://github.com/kechel/ParticleMovementSimulator/blob/master/examples/Acceleration-of-charged-particles-in-alternating-fields/Acceleration-of-charged-particles-in-alternating-fields-example-1.pms

and

https://github.com/kechel/ParticleMovementSimulator/blob/master/examples/Acceleration-of-charged-particles-in-alternating-fields/Acceleration-of-charged-particles-in-alternating-fields-example-2.pms