

# Physics news on the Internet (based on electronic preprints)

## 1. Charge confinement

The Penning trap, a widely used device for holding and accumulating charged particles, employs rotation in electric and magnetic fields. Because of field and medium inhomogeneities, however, particles slowly lose their angular momentum and so escape the trap. In a new technique developed by American scientists, an additional rotating electric field is applied, which restores the lost momentum thus producing a considerable increase in confinement time. The effective storage of rare charged particles and more accurate ion-based atomic clocks are potential benefits.

Source: *Physics News Update*, Number 346

<http://www.hep.net/documents/newsletters/pnu/pnu.html#RECENT>

pressed so initiating the star formation process. Many galaxy collisions are observed to occur at large distances, and most of the existing galaxies may have once undergone such a collision, but at the present time a galaxy collision still in its initial phase is a very rare event, and the one reported is in fact the first ever observed.

Source: <http://www.stsci.edu/>

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## 2. Solar corona heating

A heating mechanism for the solar corona is suggested by SOHO (Solar and Heliospheric Observatory) data. The corona, the outermost layer of the Sun's atmosphere extending for tens solar radii into space, is heated, as first measured 55 years ago, to more than  $10^6$  K, i.e., much in excess of  $6000^\circ\text{C}$ , the temperature of the Sun's visible surface (photosphere). Exactly how energy is transferred from the relatively cold photosphere to the hot corona has until recently remained a puzzle, two widely discussed mechanisms being mechanical waves in the Sun's upper convective zone and the absorption of the energy of magnetic-field-induced electric currents.

SOHO pictures reveal that the energy supply is due to the interaction of the so-called loops, i.e., plasma entities that follow magnetic lines of force and carry extremely strong electric currents. When the loops interact, the currents and magnetic fields short-circuit thus giving rise to electrical discharges which heat the corona. It is found that the energy carried by the loops is sufficient to heat the corona to above  $10^6$  K.

Source: <http://sohowww.nascom.nasa.gov/>

## 3. Globular clusters in colliding galaxies

While the usual globular clusters of our Galaxy consist of its oldest stars, over 1000 similar clusters of bright young stars have been observed in the collision of two nearby galaxies using the Hubble Space Telescope, which are of the same size as their Milky Way counterparts. Globular star clusters probably formed from giant clouds of molecular hydrogen after galaxy collisions somehow caused them to be com-