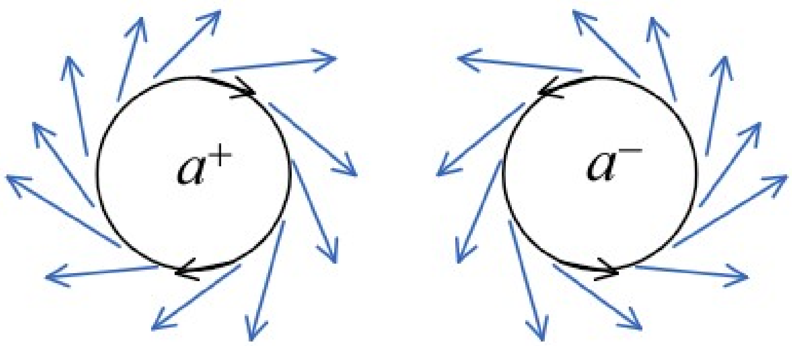
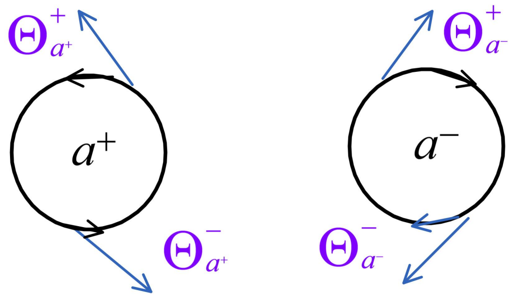
The Electromagnetic Effects of Attraction of Repulsion

The preonic field is composed of free $preons^{(+)}$ uniformly distributed in quantum-geometrical space. Free $preons^{(+)}$ interact with particles or structures matter in accordance to the laws of momentum which as we have seen govern preonics of which is a generalization of optics. When interacting with a particle or structure, $preons^{(+)}$ are absorbed and emitted following the structure of the particle or structure. When the components of a particles or structures are random, the absorbed and reflected $preons^{(+)}$ are also random so that the momentum of the neighbouring preonic field is equal to zero. That is: $\vec{P}_{\Theta} = \sum_{i=1}^{m_{\Theta}} \vec{c}_i = \vec{0}$.



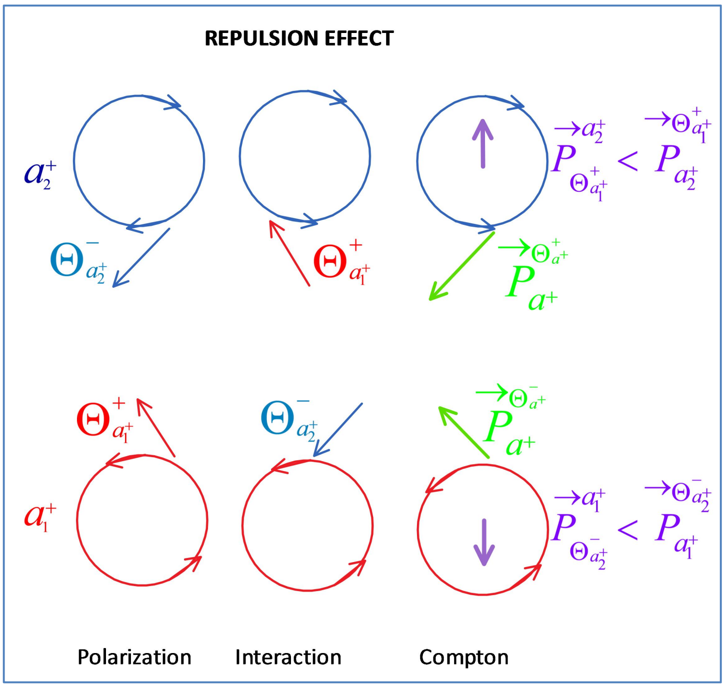
However when the components of the particle or structure (electrons for example) are aligned in which case the absorbed and reflected $preons^{(+)}$ will consequently be aligned. Such particles or structures which components motions are aligned are called charged. The interactions between the preonic field and a charged particle or structure cause the polarization the preonic field which we call the magnetic field. From the discussion about optical reflection we know that the direction of the reflection will depend on the direction of the particles the $preons^{(+)}$ will interact with. The figure above is a diagram that shows the dependency of the reflection of $preons^{(+)}$ on the orientation of a particle or structure. The black vectors represent the direction of the components of the particles or structures a^{+} and a^{-}, and the blue vectors represent the polarization of the preonic field in the regions neighbouring them.



When two charged particles or structures come into proximity, they each interact with regions of each other's polarized preonic field. The figure on the left shows how we will represent and label charged particles or structures and the interacting regions of the polarized preonic field.

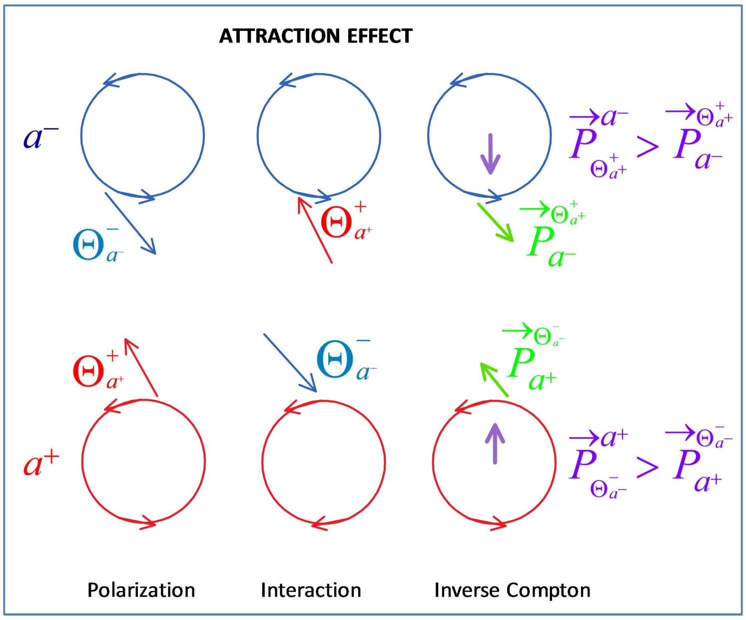
Compton Scattering and the Repulsion and Attraction of Charged Particles.

We have shown in the section on reflection of light that when applying the laws of momentum to the interaction between photons and atomic electron that the Compton scattering occurs when $\overset{\to e^-}{P}_{\gamma} > \overset{\to \gamma}{P}_{e^-}$ and the inverse Compton scattering when $\overset{\to e^-}{P}_{\gamma} < \overset{\to \gamma}{P}_{e^-}$ where γ is the incident photon and $\overset{\to e^-}{P}_{\gamma}$ and $\overset{\to \gamma}{P}_{e^-}$ are respectively the momentum of the $preons^{(+)}$ emitted by the electron and the momentum imparted by the photon with which it interacts. Conservation of momentum requires that the momentum of the electron must change by a vector of equal magnitude but inverse direction of the sum of $\overset{\to e^-}{P}_{\gamma}$ and $\overset{\to \gamma}{P}_{e^-}$. That is, $\Delta\vec{P}_{e^-} = -\left(\overset{\to e^-}{P}_{\gamma} + \overset{\to \gamma}{P}_{e^-}\right)$. This implies that if $\overset{\to e^-}{P}_{\gamma} > \overset{\to \gamma}{P}_{e^-}$ then the momentum vector of the electron will increase in the direction opposite of the point of interaction by $\Delta\vec{P}_{e^-}$. Inversely, if $\overset{\to e^-}{P}_{\gamma} < \overset{\to \gamma}{P}_{e^-}$ then the electron's momentum vector will increase towards the point of interaction by $\Delta\vec{P}_{e^-}$. Whether we have a Compton or reverse Compton scattering depends on the relative direction of the photon and electron (or particle or structure). That is, based on the laws of momentum, if the photon and electron at the point of interaction move directly towards each other, then $\overset{\to e^-}{P}_{\gamma} > \overset{\to \gamma}{P}_{e^-}$ and if their trajectories intersect tangentially, then $\overset{\to e^-}{P}_{\gamma} < \overset{\to \gamma}{P}_{e^-}$. The Compton scattering and its inverse are special cases of preonic interactions which can explain the effects of repulsion and attraction of charged particles.



The figure on the left illustrates the interaction between two oppositely charged particles (a^+ and a^-) . The circular vectors represent the angular momentum of the particles and the blue and red vectors correspond to the direction of the polarization preonic field respectively. Since the polarization of $\Theta_{a_1^+}^+$ is opposite to orientation of a_2^+ then $\overset{\rightarrow a_2^+}{P}_{\Theta_{a_1^+}^+} < \overset{\rightarrow\Theta_{a_1^+}^+}{P}_{a_2^+}$ and $\Delta\vec{P}_{a_2^+}$ will point away from $\Theta_{a_1^+}^+$, thus a_2^+ will move away from a_1^+. Similarly, the polarization of $\Theta_{a_2^+}^-$ is opposite the orientation of a_1^+ so that $\overset{\rightarrow a_1^+}{P}_{\Theta_{a_2^+}^-} < \overset{\rightarrow\Theta_{a_2^+}^-}{P}_{a_1^+}$, consequently a_1^+ will move away from a_2^+. This explains the effect of repulsion between two similarly charged particles (and structures).

In the figure on the right, we have to particles of opposing charges. Here since the polarization of the region $\Theta_{a^+}^+$ is opposite to the orientation of a^- and the region $\Theta_{a^-}^-$ is polarized in opposite the orientation of a^+ then $\overset{\rightarrow a^-}{P}_{\Theta_{a^+}^+} > \overset{\rightarrow\Theta_{a^+}^+}{P}_{a^-}$ and $\overset{\rightarrow a^+}{P}_{\Theta_{a^-}^-} > \overset{\rightarrow\Theta_{a^-}^-}{P}_{a^+}$ and as a result $\Delta\vec{P}_{a^+}$ will point to a^- and $\Delta\vec{P}_{a^-}$ will point to a^+. Therefore a^+ and a^- will move towards each other and appear to



be attracting.

As we shown, the observed repulsion between like charges and attraction between opposite charges does not result from repulsion and attraction between the particles themselves but from their interactions between the preonic regions polarized by other particles.

Also, since the polarized $preons^{(+)}$ are emitted radially from a charged particle or structure, the intensity or momentum of the polarized region follows the inverse square law. In fact the inverse square law of the momentum of a magnetic field is a consequence of QGD's preonics.

Interaction Between Large Charged Structures and the Preonic Field

Large structures composed that have aligned charged particles behave in the way we have described in the preceding section. The main difference is that the effect of a large number of aligned charged particles creates more intense polarization over a much larger region of the preonic field.

The intensity of the magnetic field at a distance r from a charged structure is $\vec{P}_{\Theta_r} \propto \frac{\Theta_{dens} S_a a_{dens}}{r^2}$ where Θ_{dens} is the density of the preonic field or $\Theta_{dens} = \frac{m_\Theta}{vol_\Theta}$, S_a is the surface of the interacting particle or structure and a_{dens} is the density of aligned electrons on the surface of a .

Note: In a following section, we will discuss how the dynamics of atomic electrons follow from QGD's laws of momentum.