

## COSMIC CONNECTIONS

I am a Franciscan because of Francis' joyful recognition of the universe being the Cosmic Christ. His praises of Brother Sun and Sister Moon point us to the stars and help us to find God's love everywhere. As a scientist I resonate with Francis' insights on cosmology and his preaching on the stewardship of Nature.

In 2007 I visited Francis' Sanctuary outside Assisi and was astonished to see a tableau of bronze figures depicting Francis teaching his companions a stargazing technique to find north - to aid them in their itinerant ministry and to set up an altar facing east. Reflecting on this image of 'Francis the Astronomer' it struck me like a thunderclap that the forces holding our material universe together might have their spiritual counterparts in various types of Love.

There are four Fundamental Forces holding the material universe together and they are Gravity, Electromagnetism, the Strong and the Weak nuclear forces. According to CS Lewis who wrote about them in 1960, there are Four Loves; namely: Eros (desire), Affection, Friendship and Charity. My challenge was to see if these four 'Loves' and the scientists' four 'Forces' are paired in mystical relationships and I started by comparing Eros, the strongest love, with the strongest of the four forces, the Strong nuclear force. I was astonished to find some striking similarities.

Scientists know the Strong force has a very short range and it operates deep inside the nucleus of the atom, holding together different types of particles trying to put as much space between them as possible. Without the constraints of the Strong force upon these particles, atoms would explode. The Strong force ceases to exist outside the boundaries of the atom.

I see a lot of similarity between Eros love in human beings and the Strong Force holding atoms together. Both are very powerful but totally inwardly acting forces. The priority in both physical attraction and emotional love is in experiencing such a strong force that only two particles or two people matter; the rest of the universe outside of the pair is not relevant. Eros love, like the Strong Force is only felt between and inside the two bodies so affected. Eros love is the strongest yet has the shortest range. When it ceases to exist the formerly closely bonded bodies fly apart by repulsion and their partnership comes to an explosive end. Similarly when protons in the atomic nucleus are freed from the constraints of the Strong Force, they too will explode apart.

According to Lewis, Eros is that most intense human state of 'being in love' where the lovers constantly gaze at each having eyes only for each other and are blind to anyone else. He suggests that Eros is so powerful that it can become like a god totally overruling the couple's existence. In his view Eros can become selfish, even demonic, and capable of urging those in its grasp to explode in dramatic acts - even suicide pacts. He concludes Eros love is inherently selfish and is not gentle unless infused by goodness from elsewhere.

Affection however is less intense than Eros. Affection is the gentle instinctive love between mother and child. Almost anyone can become the object of another person's affection. Outside the family it is typically experienced by a group, such as a party of

pilgrims or a platoon of soldiers. Affection is born through familiarity and surprisingly we can experience affection for someone who is not at all like us but happens to share a particular set of life's circumstances. Affection means we can learn to have regard for someone with whom we might normally be at odds with. Affection reaches beyond outward behaviour to appreciate the true person within. It leads to loving unattractive people such as lepers, which Francis embraced.

According to Lewis Affection is endangered by jealousy or bereavement. For example should someone in a non-religious family become a Christian and start going to church, their new behaviour is seen as changing sides or as an act of betrayal. For those bound by Affection any change threatens loss and the group's reaction can be as savage as that of a dog when his meal is snatched away! When a controlling person misuses affection to get their own way, then affection becomes the demon leading to a broken relationship. For affection to be positive it has to be accompanied by goodness.

Affection is a short range, almost hidden force, rarely experienced outside the close family or group. To my surprise it closely resembles the Weak force. The Weak force is extremely localised and controls from within the smallest atomic particles inside atoms. Its task is to hold together the constituents making up atomic particles. Its effects are never experienced outside of the particle; but it is very important, as without the Weak force radioactivity would not exist and the Sun could not ignite its nuclear furnace to provide the heat and light necessary for all life on earth.

Although humans are blissfully unaware of the Strong and Weak forces we readily experience the effects of the Electromagnetic force as it powers electric motors in our clocks and constitutes the colours of the rainbow. It enables compass needles, mobile 'phones and microwave cookers to do useful things. Electromagnetic effects become apparent when electric currents flow along copper wires wrapped round an iron core turning it into a magnet. When the current stops the iron becomes demagnetised. Electromagnetic forces travel infinite distances even though it weakens quite rapidly in the process.

This brings us to look at Friendship love, finding it depends less on who are the friends or the types of people involved but rather on the common interest they share. Friendships based on a common interest grow when others having the same interest want to join in. This is often seen in recreational activities like golf or Bridge. Friendship depends on two or more people 'seeing the same truth' and it is the common purpose they share which matters most; but in the absence of goodness friendships also can become selfishly intense.

I'm intrigued to find similarities between the Electromagnetic force and Friendship love, especially if you imagine replacing copper wires by people! The tie of friendship between people is not eliminated by distance. Friends sharing a common purpose remind me of electricity coursing through a bunch of copper wires forming an electromagnet. Their common purpose is felt by other people as an attractive force drawing them in as new friends. If the common purpose (the electric current) ceases for whatever reason then the group friendship ceases, just as if the electricity is switched off. I see Electromagnetism and Friendship being the physical and spiritual aspects of the same phenomenon.

The problem with the three human loves - Eros, Affection and Friendship - is that they are generated from within our soul, our human nature, and if left to their own devices could become rivals to God. These loves are incomplete until they are infused with goodness; but goodness only comes from God's gentle love which the Bible names as 'Charity'. By Lewis' reckoning Charity is the least intense of loves and like the effects of Gravity, the weakest force, reach the boundaries of the universe affecting atoms of matter everywhere. Gravity holds us to the ground, the earth around the Sun, the moon around the earth and our planetary system as a unity inside our galaxy.

So I am not surprised to find that Gravity, the weakest fundamental force, matches God's all-pervading love of Charity.

The love of God is reciprocated by our spirit. Charity comes through God's grace and is always there for us, wherever we happen to be. It knows no limits and brings God's goodness into our feeble attempts to love one another through the lower loves of Friendship, Affection and Eros (desire). If we were to depend only on these three loves then our hearts would get broken; but in the presence of Charity, God's grace helps us to bear the hurt of any type of broken human love. Jesus tells his followers that to love God properly requires them to replace human love with charity love, which comes not from humans but from God. Like Gravity God's love pervades everywhere in the universe and touches everyone.

Scientists strongly suspect Gravity links all Four Fundamental Forces together and they earnestly seek the missing "God Particle", as they have termed it, to balance the equations. They see the material universe holding together by Gravity acting with the other three Fundamental Forces. In a corresponding manner Charity renders all human loves into one harmonious force in a spiritualised universe. Eventually everyone will understand that our universe is both material and spiritual in the form Christians identify as the Cosmic Christ.

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*The article above is a précis of one of the chapters in his, as yet unpublished book, From Stardust to Sainthood.*

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