Quantum Physics and Christian Faith

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"Traditional" or "Orthodox" Christianity is founded on the conviction that God exists in the paradoxical state of "infinitely distant" yet "closer to us than our own heart." That state is characterized by "superimposed" and "entangled" conditions that involve antinomies: God as both One and Three; Christ as both God and man; the Church as a fallen earthly institution and as a source of divine grace and life, etc. This article demonstrates the analogous relationships that exist between such elements of Christian faith and the domain of quantum mechanics. The presence and activity of God are seen in a new perspective, shaped by recent scientific discoveries concerning the microcosm. The world of the "very small" holds the key to a perception of God that reveals both His continuing creative work and His ineffable mystery.

Introduction

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God beyond Reality

A prayer in the Orthodox Christian tradition describes the Holy Spirit as 'everywhere present, filling all things'. It is that Spirit, who creates and sustains the underlying Reality—the transcendent Force or Field—that gives birth to both the virtual and the actualized aspects of the world we live in. Genesis declares that at the creation the Spirit 'moved across the face of the waters', bringing order, harmony, and beauty out of primeval chaos. That is, the Spirit 'realizes' or 'actualizes' the cosmos (from which we get our word 'cosmetic', implying order and beauty). In a Biblical perspective—the perspective held by traditional Christianity, based on individual and communal experience—the Spirit of God is the *Spiritus creator*, who relates to his creation in personal terms, terms of communion and love. This does not contradict the Biblical affirmations regarding the creative activity of Christ, the Son (Jn 1:3; Col 1:16; Heb 1:2–3), but rather complements them. Together with the Second Person of the triune Godhead, the Spirit creates, shapes, and directs all of reality toward its final end, which is eternal participation in divine Life (Rom 8:5–11). This is a *trinitarian* perspective.

The Trinitarian perspective that lies at the heart of Christian faith and experience is firmly rooted in Hebrew as well as in Christian Scriptures. The Old or First Testament presents images of the person and work of 'God', of the 'Word' (as divine speech, Gen 1:1–3; in prophetic oracles, etc.), and of the 'Spirit'. For its part, the New Testament unites 'God' or 'Father', the 'Son' (Jesus, the Word or *Logos* of God, Jn 1:1ff), and the 'Spirit' in a large number of tripartite formulas and other passages. The most obvious of these are references to Father, Son, and *Paraclete* ('Advocate', 'Counselor') or Spirit of Truth, in Jesus' Farewell Discourses given in John 14–16. Other examples include liturgical formulas such as Second Corinthians 13:13 (or 14 in our translations): 'The grace of the Lord Jesus Christ, the love of God ['the Father', the Liturgy will add], and the communion of the Holy Spirit'—together with Ephesians 2:18 and 3:14–19, Romans 1.3–4, First Peter 1:2, and so on.

Accordingly, in Biblical terms God is properly conceived as 'Father', the ultimate Principle, Source, and Finality of all things; as 'Son', the divine-human Person, eternally 'generated' by the Father; and as 'Spirit', who eternally 'proceeds' from the Father, to sanctify the world and human life (an aspect developed especially in Romans 8). 'Generation' and 'procession' are terms used by the Evangelist John. They were taken up during the first four centuries AD by the greatest theologians of the Church and woven into the doctrine of the Holy Trinity. The eternal Son of God and the divine Spirit of God, in the thought of St Irenaeus of Lyon, are the 'two hands of the Father', who together create and sustain all things, while relating *personally* to those who seek God and long for God. Together the three Persons of the Godhead constitute *one God*—'one in essence and undivided', as the Liturgy of the Church declares—who liberates humanity from death and corruption through the central event of human life and history: the incarnation, death and resurrection of the eternal Son of God, the God-man Jesus Christ. This Trinitarian perspective is essential if we are to grasp the full reality of God and of his relationship to the created order.

We have to conclude, then, that God lies 'beyond the beyond'. He brings all things from non-existence into being, and he provides it all with purpose and direction, while being in no way confused with it. His continual act of creation, however, is not limited to the material world of our experience. If there are indeed other worlds, other dimensions of created reality, these too have their origin and end in him. As do any other conscious life forms elsewhere in the cosmos, if in fact they exist. There is in this perspective a certain hierarchy of being. We begin and end 'beyond being' with God himself, three 'Hypostases' or 'Persons' united in one divine substance or essence. This God is 'beyond reality' and beyond existence itself, as the ultimate Source of everything: of all being and of all meaning and value. He creates and sustains the universal generating field of Reality, which corresponds to Bohm's implicate order. From that field there comes forth virtual reality in its multiple expressions, some of which become actualized as quanta. These, then, constitute

matter and perhaps 'spirit' in the form of consciousness. Consciousness, however, more likely derives from a creative process that is independent of matter and of the quanta that compose it. As I will point out later on, consciousness seems to be a transcendent phenomenon, common to human beings and certain higher animals, but perhaps also to other forms of life. Some would claim that human consciousness derives directly from the Consciousness of God, making up what Scripture calls the *imago Dei*, the image of God, that characterizes every human person.

The World in Superposition

All of this means that we need to look at the world in an entirely new way. We need to grasp the fact that created Reality is vastly more extensive, more complicated, and more mysterious than we can possibly imagine. Our five senses help us to comprehend the classical world around us and, to some extent, within us. But Reality itself is far more than our senses can fathom. (Just imagine that what is called the 'solar neutrino flux' passing through our bodies is in the neighborhood of one hundred trillion neutrinos each second, and we are oblivious to each and every one!) Various well-grounded theories hold that there exist, if not other worlds, at least other dimensions beyond the four that we directly experience: three of space and one of time. It may well be that we are surrounded by and perhaps filled with multitudes of dimensions of the 'real' that we will never know, never perceive, and never be able to analyze or manipulate.

Yet conscious, intelligent beings in those dimensions may very well have the capacity to know and to interact with us. This, in any case, is the conviction of people who have experienced the presence and intercession of what Christians call 'the communion of saints'. These are souls who are physically dead. Yet they continue to exist on another plane of reality. They have the capacity to pray for us and to influence events in our space-time universe. What has been identified as 'angels' and other spiritual beings may also dwell in a domain or dimension of reality from which they can interact with us. There are countless witnesses to such occurrences, and countless experiences of the 'beyond' that influence our life, for good or ill. If there are saints and others who can pray for us, then it seems likely, based on the experience of most of the world's population, that there are also what are called 'demons', nefarious powers that can likewise have an impact on human life. If quantum theory has anything to say about realities like these, it is to affirm that beyond our very limited horizons, in the macro- and microscopic dimensions of our knowledge and experience, there exists a supra-cosmic Field from which all things proceed and toward which all things move.

From a theistic perspective, we have to stress once again that this movement, this process inherent in creation itself, leads toward an End with purpose and meaning. The experience of billions of Christians, Jews, Muslims, and others has confirmed

beyond doubt that human life derives both its purpose and its significance from the transcendent 'Reality beyond Reality' that we call God. We conceive of that ultimate Reality in different ways. But all major faiths agree that this Reality is 'intentional', purposeful. It not only creates the world; it also saves it. This means that God preserves his human creatures—bearers of his divine Image—beyond physical death and enables them to participate eternally in a sublime mode of existence that the New Testament calls 'eternal life', life in 'the Kingdom of God'.

In classic Christian terms, that divine Force or Power which issues from the Godhead can be thought of as 'divine energies' that are manifested in time and space by the Persons of the Son and the Holy Spirit. Together the Son and the Spirit work out what theologians call the 'divine economy'. Their united action accomplishes this saving, transforming work by investing human persons from the moment of their conception with ultimate value and purpose. (This is what leads theologians to affirm that 'every human being is worthy of infinite compassion'!) That saving work liberates humankind from the bondage of sin, death and corruption by destroying the power of death through the *descensus ad inferos* or 'harrowing of Hell'. This refers to the descent of the crucified Christ into Sheol or Hades, the realm of the dead, to liberate those held in captivity to the power of death by what can be considered a 'new Exodus'. First Peter alludes to this in chapters three and four. The same theme appears in Matthew 16:18, Ephesians 4:7–10, Revelation 1:18, and it is depicted with special force in the Orthodox icon of Pascha or Easter. The descent into Hell, the domain—or rather the condition—of endless alienation and separation from God, is then reversed and its purpose is fulfilled by the resurrection and ascension of the Son of God. Identified by the angel in the tomb as the eternally Crucified One, the Son 'ascends into heaven' in the fullness of his God-manhood, bearing within himself both divinity and transfigured humanity.

Through baptism into his Body, the Church; through faith that inspires personal commitment; and through works of love or acts of charity, human persons are literally 'incorporated' into Christ's divine, glorified life. This economy or saving work is complete when those who are thus 'saved' attain eternal participation in the very life of God, a participation that the Church Fathers audaciously termed *theōsis* or 'deification'. Yet even in this life, Christian faith maintains, those who long for this salvation can enjoy it already and personally in the form of what the apostle Paul calls 'the first fruits of the Spirit'. These offer a foretaste of eternal life, bestowed in the here and now by the Spirit of God. Those 'fruits' are, very simply, the grace and power we know as love. Not *eros* or erotic love, nor *philia* or friendship; but *agapē*. This is the freely offered love of God, a love of disinterested self-sacrifice, which became manifest and accessible to us through the death on the Cross of Jesus Christ. It is precisely this love, an expression of God's very Being, that provides meaning to us in an otherwise meaningless universe.

Analogies

We can now explore a few parallels between quantum phenomena and certain tenets of Christian faith. These are to be understood as mere analogies. We should avoid the impression that ecclesial dogmas are derived from or are dependent upon discoveries in the area of quantum mechanics or, for that matter, findings in any other area of science. Elements of faith are derived rather from direct experiences of the Divine, the Holy. No scientific methodology has access to these realities. Yet the analogies we draw can, I believe, be helpful in providing us with a picture of the universe and of ourselves that corresponds both to the world of Scripture and to the world of physicists, biologists, and others in the community of professional scientists.

Most of the analogies recall theories of superposition and entanglement. As we have seen, 'spooky actions at a distance' are dependent on non-locality. Early attempts to understand this phenomenon, together with particle-wave duality, included the 'double slit' experiment, devised by Thomas Young back in 1801 and perfected during the twentieth century. The experiment involves sending a beam of light or even a single photon through an apparatus with two narrow parallel slits, behind which there is a detection screen. A beam of photons so projected will create an interference pattern on the screen, showing that they have (improbably but really) passed through both slits at once and have interfered with themselves. The photon is a particle; but at a more fundamental level it is a wave, a 'probability wave' that collapses, according to the Copenhagen theory, upon observation or measurement, transitioning from a virtual to an actual state. At the microscopic level, then, quanta exist in a particle-wave superposition. Repeated experiments have provided what seems to be irrefutable evidence that all of quantum reality exists in this superposition of states. The Copenhagen theory assumes that the transition from a virtual to an actual state occurs through collapse of the wave function in a process of decoherence.

David Bohm, however, with a significant number of physicists today, rejects the notion of wave function collapse. His theory of 'quantum potential' describes a process that directs the non-local movement of quanta or quantum particles on every level of reality. He pictures the quantum potential as a field that fills the universe and, as a source of *information* rather than energy, influences virtually everything that exists. In fact, it can be said that the quantum potential 'contains' all that exists and serves as its source of being. What we perceive empirically are individual, separated realities; but these are in fact illusions. All that we call 'actualized realities' are a kind of emanation, an ephemeral manifestation of the deeper Field that underlies literally everything. In this perspective, all that exists is interconnected, and the world is essentially a hologram, governed by what Bohm terms a 'holomovement'. In this view all things are in flux, directed by the underlying quantum Field, which can be identified with the transcendent Reality Force we spoke of earlier.

For Bohm, all of reality is characterized by holographic entanglement, resulting in what he terms an Undivided Wholeness. As we have seen, that Wholeness derives ultimately from the implicate order, and thus it can be likened to the ultimate Reality behind all being, fashioned and put into operation, from a Christian point of view, by the ceaseless creative activity of the Holy Spirit. Bohm, of course, would not make that connection or agree with its implications. His insights, though, correspond strikingly to a Christian perspective of the ongoing creative work of the Spirit within the cosmos, a cosmos best viewed holographically and governed by information that has its source in God.

We have already seen how superposition works on the microcosmic scale of things. The Copenhagen theory holds that a quantum reality exists in the virtual state of a 'probability wave'. It constitutes a superposition of wave-like and particle-like properties. Most physicists who work with this theory assert that the probability wave or (mathematical) wave function is actualized or rendered 'real' when it collapses under the influence of an observer. With that collapse a material reality emerges that is no longer in a superposition of states. Superposition can generally be thought of as two apparently contradictory states existing simultaneously as an 'entangled whole'. Before it is subject to measurement, a quantum is both wave and particle; its spin is both positive and negative, both up and down; and, like Schrödinger's imaginary cat, it can be, as it were, both 'dead' and 'alive'. That is, it exists in a way totally unlike ordinary macrocosmic objects, which can assume only one state at a time. In the macrocosm, a water wave cannot be a pebble nor a pebble a wave, just as in binary notation a bit must be either 0 or 1, but never both at once. What will enable quantum computers to work at astronomical speeds compared to today's clunkers is the fact that units of information will be expressed as both 0 and 1. In the Information Age, that is, superposition will undoubtedly carry the day! It will no longer be a concept limited to the microcosm but will be seen to characterize macrocosmic events and realities as well.

We should note, however, that among themselves physicists use the term 'superposition' in a more technical way. It refers, once again, to the wave-like aspect of quantum phenomena that exist in a probabilistic blending of seemingly contradictory or incompatible states. Those phenomena or quantum entities can be actualized by observation, which destroys their coherence and reduces them to a single actual state. Interference peaks in the double-slit experiment are superposed, for example, as are the waves created by the pebbles we dropped into a pond. In quantum information processing, the qubits also exist in a superposition of states (0 and 1).

This is all rather straightforward. If we look for a more complete definition of the concept, we run into statements like this, taken from *Wikipedia*: 'The linear combination of two or more eigenstates [of a physical quantity] results in a quantum superposition of two or more values of the quantity'. To a physicist, this makes perfect sense. To most people it is about as intelligible as the classic 'conversation stopper'

from an old *Mad Magazine*: 'I had one grunch but the eggplant over there'! For the truly intrepid, we can mention Huygens' principle of superposition: 'The displacement of any point due to the superposition of wave systems is equal to the sum of the displacements of the individual waves at that point'. This too is quite intelligible if we parse it carefully enough.

A simpler example, however, takes us back to Heisenberg's indeterminacy principle. You recall that this principle states that at a given moment in time it is impossible to specify exactly both the momentum and the position of a quantum particle. If we determine the precise value of the particle's momentum, for example, then its location is inevitably thrown into a superposition of two or more states, and determination of its exact value is impossible. In fact, once the particle's momentum is determined, we have to accept that *it has no location*! It conforms to the indeterminacy (and the weirdness) inherent in all conjugate variables: when its momentum is precisely determined, the particle simply has no definite position; and vice versa, precise determination of its position means it has no actual momentum.

To grasp this a little better, let us go back to that *Wikipedia* definition. An 'eigenstate' or 'eigenvalue' of a given physical quantity (e.g., momentum or position) refers to the intrinsic state or value of a system. (The terms are derived from the German *eigen*, 'own' or 'proper to', meaning 'the precise value' of something.) Because of the indeterminacy inherent in any quantum system, either position or momentum can be determined precisely at any given moment, but not both at once. If we sacrifice precision regarding position, then we can determine the 'inherent' or characteristic value of momentum, and vice versa. That determination gives us its eigenstate, with a specific eigen-value or number-value. This occurs, remember, not because specifying one quantity, e.g., momentum, somehow hides information as to the particle's actual location—as Heisenberg thought—but because once the eigenvalue of its momentum is determined, the particle simply has no position; that quantity does not exist, except in terms of Paul Dirac's so-called q-numbers, which express probabilities.

If we combine in linear fashion two or more eigenstates of a given physical quantity we arrive at a quantum superposition of two eigen-values (for example, the quantum is in two or more locations at once). This paradoxical mix of states is crucial for the phenomenon of teleportation. The Swiss physicist Nicholas Gisin and his team have done ground-breaking work in this area. As frivolous as it may seem, the link between superposition and teleportation can be well described by means of a limerick:

Hymn of praise (doggerel) in honor of Prof. N. Gisin

The conundrum of teleportation
Meant for physics a constant frustration,

'Till a guy from Geneva
Was able to achieve a
Quantum transfer of new information.

A couple of photons entangled
Gave rise to something newfangled:
A theory that 'here'
Means really it's 'there',
Leaving Newton's worldview quite mangled!

To the great disappointment of *Star Trek* fans, we will probably never get to the point where Scotty can literally 'beam up' somebody. But Gisin and his colleagues managed to transport a photon some twenty-five kilometers, so that its quantum state was preserved and its information could be stored in a crystal. In 2017, Chinese physicists were able to establish quantum communication over a distance of some 1200 kilometers, using entangled photons. And the following year other physicists managed to achieve two-way communication with a single photon! Thanks to their work and that of others, the door is now open to the practically limitless teleportation of information (despite contrary interpretations of the 'no-communication theorem'). Entanglement, as a special case of superposition, plays a crucial role in all of it.

The principle of superposition postulates that a quantum object is in all possible states until it is observed or measured. Like the wave-particle duality, superposition 'decoheres' by observation. Once measured, the wave function of the object in question collapses, and 'all possible states' are reduced to a single eigenstate with a single eigenvalue. It is, as it were, 'actualized' so that it is no longer in a superposition of states. Once the box was opened and its contents were observed, Schrödinger's cat was either dead or alive, but it was not (one could say it was no longer) both at once.

For our purposes, then, we can think of superposition as the linear combination of two or more states or values that are, or seem to be, logically contradictory or inconsistent with one another (cat dead *and* alive, spin up *and* down, polarization horizontal *and* vertical, etc.). Now we have to ask, what is the relationship between superposition and entanglement? Are they identical, or do we need to make a distinction between the two? Theorists have pointed out that all entangled states involve superposition, but the reverse is not true: not all superposed states imply entanglement. From another point of view, entanglement involves two or more separated quanta and the instantaneous transferral of information from one to the other. This non-local transferral does not involve the loss of information, because the two entangled quanta act as a single system, a single entity. Loss of superposition, though, does entail a loss of information. This occurs, for example, with the collapse of a wave function and the transition of a 'wavicle' into a specific particle.

With the loss of superposition, the wave-like aspect of a quantum is lost, and with it there is a loss of information.

Because of this difference, the examples of paradoxical elements of Christian faith I want to mention might better be described as analogous to entanglement rather than to superposition. (And the term 'similitude' might be more appropriate than 'analogy'.) There is no loss of information involved, and the two or more entities or states act as a single entangled reality. The relationship between the various entities is also permanent, independent of time and not susceptible to decoherence. Superposition is still a useful image to use with these analogies, though, since they are based on the combination in a single 'system' of apparent opposites or irreconcilable factors. Nevertheless, beware! We are not talking here about what has been known as *analogia entis*, an 'analogy of being' (the idea that the 'being' of the created world offers analogies to the being or reality of God). Nor are we interested in this context in the argument put forth by Karl Barth that rejects *analogia entis* in favor of an *analogia fidei*, an 'analogy of faith' (referring to the ultimate authority in religious belief, usually expressed in creedal statements or as Scripture itself).

The Orthodox position on analogia is quite different from that of either Protestant or Catholic theology. The question at issue is what is termed *theōsis* or 'deification', meaning our participation in the life of God. We cannot properly speak of the 'being' of God, because God is 'beyond being'. (When the term seems unavoidable, we can write it with a capital 'B' to signify the difference between created and uncreated reality). Not even the quality of 'existence' can be attributed to God, since he is 'beyond existence', as its Author and End. The 'Being' or inner essence of God is utterly beyond any possibility of 'participation' by anything created. That essence remains wholly transcendent, unattainable, and unknowable. Yet God does make himself 'participable' (to use a good French word that ought to exist in English). He renders himself accessible and, to that extent 'knowable'. Speaking of the reconciliation between Jews and Gentiles in Christ, St Paul declares that 'in him [Christ Jesus] we both have access in one Spirit to the Father' (Eph 2:18).

In Orthodox Christian thought, that possibility for 'access' to divine Life—for participation in God and knowledge of him—is given through what the patristic tradition (particularly the fourteenth-century theologian Gregory Palamas) terms *energeia*, the 'divine Energies'. These can be thought of as 'attributes' of God, such as wisdom, goodness, holiness (in the sense of 'separateness'), omniscience, omnipotence, righteousness, justice, and love. To these we have to add the attribute, suggested by the Russian philosopher Nicholas Berdyaev, of 'inexplicable Mystery'. Arguments have been made that the divine energies are ontologically distinct from the divine essence. This is a misunderstanding that could all too easily lead to polytheism. We cannot even say that the distinction between the three Persons of the Godhead is ontological. Father, Son, and Spirit are united in the very same 'essence', and in all respects they share the fullness of their transcendent Being. The same must

be said for the divine energies: they are manifestations within creation of the God who, in his innermost essence is and remains utterly transcendent relative to any created reality. God *ad intra*, God *ad extra*: that may be the ultimate superposition!

Superposition in Elements of Faith

Ontologically, 'heaven' and 'earth' exist in totally different spheres or realms, with no apparent connection between them. Yet God is both transcendent and immanent, totally beyond the world and totally present to it. In the Persons of the Risen Christ and the Holy Spirit, God is intimately involved in every human life as he is in the world as a whole, both microcosm and macrocosm. Somehow we have to grasp this (superposed!) duality, if we are to move beyond popular images of a God who, as J.B. Phillips put it, is 'too small'.

A first example would be that of the *Holy Trinity*, which is intrinsically both One and Three. This is a transcendent example of Aristotle's Platonic image of 'one over many', a 'superposition' that foreshadows the binary character of a qubit, both zero and one. As we have seen, Christian doctrine holds that the Godhead comprises three Hypostases or Persons in a single divine reality, 'one in essence and undivided'. A question that throughout the centuries has to a certain extent distinguished Eastern from Western Christianity (Orthodoxy, and Latin or Roman Catholic theology) is which one of these qualifications, 'oneness' or 'threeness', predominates? An over-simplification has long held that the East begins its reflection with the Three Persons of the Godhead to arrive at their essential Unity, whereas the opposite is true in the Latin West. There, it is said, one begins with the fundamental Unity of God and proceeds toward discernment of the Three Persons. Orthodox theologians will point out that revelation begins and ends with disclosure of the *personal* quality of God. The New Testament presents us first with the person of Jesus of Nazareth, who is sent by 'God the Father', then baptized, filled, and directed by the Holy Spirit.

It is only through meditation on the sacred writings that the essential unity which, a-temporally and non-locally, binds the Three together becomes manifest. That meditation on the 'mystery' of the Three Persons is deepened by prayer, together with participation in the sacraments and communal worship. The end of such an inner, spiritual journey is communion with God that has proceeded along two paths at once. On the one hand, the Spirit inspires a *lectio divina* or 'spiritual reading' of the Biblical sources, which draws us into communion with Christ, and through Christ, the eternal Son of God, into communion with God the Father (e.g., Jn 3:16–17; Phil 2:5–11; Heb 1;1–3).

On the other hand, readers who open the New Testament for the first time encounter initially the person of Jesus of Nazareth (if, that is, they can make their way past the intimidating genealogy that St Matthew presents at the beginning of his Gospel). Jesus then reveals the presence and purpose of God his 'Father', and

subsequently he describes the work of the Spirit as the source of regeneration and conveyer of Truth within the Christian community (a theme developed especially in John 14:26–27 and 16:13–15). These two pathways—from Spirit to Son to Father, and from Son to Father and Spirit—co-exist. Like the relationship between the divine Persons, they constitute a single 'way', a single 'spiritual system'. The truly paradoxical character of revelation is its presentation of Three Persons, distinct yet essentially interrelated, who constitute a single, undivided Godhead. Because there is here what we might call a 'spiritual entanglement' or 'superposition', it is possible to assert unambiguously and unreservedly that Christians, like Jews and Muslims, believe in and worship *One God* and One God only.

A second analogy between the quantum world and Christian faith concerns the *divine-human nature of Christ*, the eternal Son of God. This is probably the clearest example in Christian doctrine of a paradoxical analogy with entangled or superimposed systems. (Rather than speak of paradox, by the way, it would be better to use the patristic term 'antinomy'. As the Greek roots of the word indicate, an antinomy expresses a reality that breaks the laws of logic: anti-nomos, 'against the law of reason'). 'Orthodox' Christians of any ecclesial tradition maintain that the man Jesus of Nazareth is also and 'wholly' the eternal Son of God. In the words of the Nicene-Constantinopolitan Creed (325/381 AD), Christian belief is in 'one Lord Jesus Christ, the only-begotten Son of God [*monogenēs*, Jn 3.16], begotten of the Father before all ages [aeons], Light of Light, true God of true God, begotten, not made, being of one substance [essence] with the Father….' The language used to specify the nature of the Son of God—uncreated, eternally generated by the Father and sharing the Father's very essence or nature—makes clear the intention of the theologians of the first two Ecumenical Councils to declare unambiguously that Jesus is at one and the same time human and divine. He is one in essence with the divine *Archē* or unique Principle of all that exists, both visible and invisible. In a word, the man Jesus is himself God.

This affirmation is firmly grounded in Scripture. In the so-called 'Christ-hymn' of Philippians 2:5–11, for example, the apostle Paul describes the pre-existent Son of God as being in the *morphē* or 'form' of God, and through his *kenōsis* or self-emptying he assumed the *morphē* of human beings. As the context makes clear, the term *morphē* is equivalent to 'essence' or 'nature'. Consequently, the passage served as a key witness behind the Church's later designation of Jesus Christ as the 'God-man'. According to the confession of the disciple Thomas (Jn 20:28), the resurrected Jesus is both 'Lord' and 'God'. The term 'Lord' (*kyrios* in Greek) is the name of 'God' throughout the Old Testament. This confession by Thomas is the clearest affirmation in all of the New Testament that Jesus, from his conception through his ascension, is God incarnate. 'God before the ages', He is also 'God in the flesh' (Jn 1:14), who assumes fallen and corrupt human nature, without himself being subject to sin (Heb 4:15).

From a particular theological perspective, it can also be said that the Son of God is the divine *Anthrōpos*, the archetype of human existence. From all eternity he is the living Icon of 'true humanity', human nature as it was originally intended to be. By his incarnation he 'actualizes' that humanity from its original 'virtual' state by assuming physical existence as Jesus of Nazareth. He renews mankind by incorporating ('embodying') that nature into himself and restoring to it its original fullness and beauty. By his resurrection and exaltation, the eternal Son of God raises transformed human nature with and in himself, so that human persons might share fully in his life and his glory. (This is beautifully spelled out in Paul's letter to the Ephesians, 3:14–19, and in the 'Christ-hymn' of Colossians 1:13–23. The hymn proper is verses 15–20.)

As with the image of the Trinity, we have in the image of the incarnate Son a veritable superposition of states, in this instance human and divine. (We can only speak of conceptual 'images' since human language can never fully express 'divinity'.) In the former case three personal realities 'beyond being' are united in a single unique Essence; and in the latter, two essences or natures (human and divine *ousiai*) are united in a single unique Person, characterized in the language of the fifth-century Council of Chalcedon as 'without division, confusion, separation or change'. And both images, like quantum entanglement, are characterized by non-locality. The realities these images depict exist 'in all possible states,' unbounded by time and space. They are 'eternally present': here, there, and everywhere. In the language of popular piety we can say that in and through each of these realities, the Holy Trinity and the Incarnate Lord, heaven and earth coalesce to provide the matrix or framework in which God works out the salvation of his world. In this light it can also be said that the phenomenon of entanglement is of divine origin. In its original form it characterizes the inner dynamic of the Godhead, and its manifestation within the created order is merely derivative. The creation, in other words, is 'shaped' in the image of its Creator!

Similar examples of contradictory or incompatible conditions, existing in a single 'superposed' state, abound in the New Testament and in the theology of the Church. We can note a few as follows:

—God is wholly unknowable, incomprehensible to human thought and inexpressible by human language. Yet this same God reveals himself ceaselessly, through his Word (revelation through the historical Jesus, in Scripture, and by proclamation of the Gospel) and through his presence in the creation ('natural theology,' based on reason and experience). This can be thought of as a superposition of apophatic and cataphatic pathways toward knowledge of God.

—The condition of human existence: the human being is simultaneously marked by sin and bearer of the divine Image; humankind is both 'fallen' and 'deified'. This is more than *simul iustus et peccator*, the Lutheran affir-

mation that man is both righteous and sinful. 'Justification' in that context is often conceived as 'imputed', which in some interpretations amounts to a legal fiction: Christ's righteousness is attributed to us, and we are thereby acquitted, although we remain sinful. This Protestant perspective, from an Orthodox point of view, focuses too heavily on divine Justice and the removal of guilt. In an extreme form, to avoid any sort of 'works-righteousness', it neglects or denies the role of 'works of love' as essential components of the Christian's spiritual journey. We are not *saved* by our works or accumulated 'merits'; there the Orthodox and Reformed traditions are in full agreement. But to Eastern Church tradition, such works are a necessary element in the ongoing spiritual struggle to attain salvation and eternal life (Eph 2:8–10). Many Lutherans and other Protestants, of course, would agree, given the fact that so many devote themselves selflessly to works of charity.

The contrast between these two states, fallen and deified, is even more evident in Latin theology, which speaks of 'original sin' as a kind of genetic disease, transmitted (as Augustine might claim) by sexual union, that infects the life of every individual. Yet the believer, by the indwelling power of the Holy Spirit, can exist in a permanent state of grace. The Orthodox tend to speak of 'ancestral sin', but the idea is essentially the same: the Christian is both righteous and unrighteous, mired in personal corruption, yet on a spiritual journey to attain the 'likeness of God'. The superposition of these two states involves our ontology. Our very being is marked by corruption, yet the divine image in which we are created (Gen 1:26–27) is indelible, and the 'worst sinner' is called to repentance and invited to enjoy eternal participation in the life of God, a state Orthodox tradition speaks of as 'deification'.

This duality of 'saint and sinner' that characterizes human existence leads both Jesus and Paul to underscore the spiritual importance of various *aporia*, logical inconsistencies that involve contradictory superposed states: 'The first shall be last and the last first'; 'The humble shall be exalted and the exalted humbled'; 'One must lose one's life to gain it'; 'When I am weak, then I am strong'.... Finally, a striking example is found in the Orthodox Paschal Liturgy: 'Through the Cross joy has come into the world!'

—As one of the Holy Trinity, the Spirit is 'wholly other'. In his essence he is utterly beyond any created reality. At the same time, as the prayer to the 'Heavenly King' declares, the Spirit is 'everywhere present, filling all things'. He is infinitely distant, yet intimately involved in every aspect of our life. St Paul describes this mysterious Presence of the Godhead as deeply personal, helping us in our weakness and offering both for us and through us prayer and adoration to God the Father (Rom 8:26–27). Patristic tradition observes that the Spirit is the only divine Person who has no other Person to reveal him (the Father is revealed by the Son, and the Son by the Spirit). As Vladimir Lossky stressed in his magisterial work *Mystical Theology of the*

Eastern Church, the Spirit will finally be revealed in the *eschaton*, in the faces of those who constitute the Communion of Saints. As 'holy', then, the Spirit is infinitely beyond and essentially 'separate' from all created reality (this is the fundamental meaning of 'holiness'). Yet he is intimately involved in our every thought and action, filling human life with his sanctifying presence, and offering ceaseless intercession for us and for God's world. A 'spiritual superposition' of Being and Act.

—Christ, in the experience and proclamation of the Church, is the risen and glorified Lord. As One of the Holy Trinity, he, like the Spirit, is infinitely beyond the world he has made. Nevertheless, he too, as one Hand of the Father in St Irenaeus' striking imagery, is continuously present and at work within the world and in human life, to offer all things to his Father, that God might be, as Ephesians declares (1:23; 3.6), 'above all, through all and in all'. Yet significantly, the risen and glorified Christ is also and always remains 'the Crucified One'. When the myrrh-bearing women entered the tomb on the morning of the resurrection, the Gospels affirm, they found it to be empty except for the presence of an angelic messenger. This heavenly figure declared, 'You seek Jesus of Nazareth, *ho estaurōmenos*' (Mk 16:6). These Greek words are usually translated 'who was crucified'. Grammatically, however, they are a gerund that forms a substantive, a noun. Literally they must be translated 'the crucified one'. Jesus of Nazareth, crucified, raised from the dead, and glorified in the presence of God the Father, remains forever 'the Crucified One'. This, one might say, is his 'essential identity.' In him death and resurrection are united in such a way that the risen and ascended Lord is and remains the Suffering Servant, who bears the guilt, the pain and the affliction of all those who 'dwell in' him (Is 53). This is the meaning of Blaise Pascal's affirmation that I come back to again and again: 'Christ is in agony until the end of the age'. Forever crucified, forever glorified! The two constitute a single entangled state that defines both the person and the work of the Son of God.

—Christian eschatology (the doctrine of 'last things') is simultaneously 'future' and 'realized'. A debate has raged for years, especially among Protestant theologians, as to which aspect predominates. Is the 'final' act of God reserved for the end of human or cosmic history? Or is that 'end' already in some way realized, actualized? Is the 'Last Day' or the Day of Judgment an event to occur at the *Parousia*, the end-time second coming of Christ in glory, to judge the living and the dead (Mt 25:31–46; Jn 5:25–29; Rom 2:5–11)? Or is it already at hand, a present reality in the life of those who seek salvation in Christ? As a passage in John 5 indicates, it is both at once. Interpreters have often raised questions about two apparently contradictory statements in the Fourth Gospel concerning 'eternal life'. In 5:25 to 29, Jesus speaks of a time when 'those who are in the tombs will hear his voice', meaning the call

> to judgment issued by the Son of God. Then all the dead will arise, some to a resurrection of life and others to a resurrection of judgment (*krisis*). The preceding verses, especially v. 24, however, declare that 'he who hears my word and believes in him who sent me *has* [present tense!] eternal life; he does not come into judgment, but has passed from death to life'.

It is important to recognize that these two passages, verses 21–24 and 25–29, form a single literary unit, governed by the laws of 'chiasmus' or concentric parallelism. This is a rhetorical form widespread throughout the Bible and in other forms of literature, both ancient and modern. In addition to a linear reading ('from A to Z,' or from beginning to end), which we are quite accustomed to, a text structured 'chiastically' invites a second reading, from the extremities toward the center. Beginning and end are parallel to one another ('inclusion' and 'conclusion'), as are successive passages, until the reader arrives at the 'conceptual center', which is the primary point or theme of the entire text. In this case, a 'concentric reading', beginning with verses 21–23, which are in parallel with verses 25–29, reaches its climax or primary theme in verse 24. This, once again, affirms that eternal life is *now*, in the present moment, for those who accept Jesus' assertion that he has come forth from God the Father. In fact, the second passage, verses 25–29, confirms this theme. It does so by qualifying the expression 'the hour is coming' with the declaration that the hour in question, the hour of Judgment, is a present reality: 'the hour is coming *and now is*!' Jesus' words in the Gospel of John allude clearly to the Old Testament notion of a future judgment at 'the Day of the Lord', which will occur at the close of human history. This is the perspective of much of the other New Testament witness as well. But Jesus qualifies that expectation, at least in John's Gospel, with the assertion that judgment has already occurred for those who accept Jesus' witness about himself. They do not come into judgment but have already passed from death to life.

In the perspective of the Evangelist John, and in that of St Paul as well, eschatology is both present and future. It makes of divine Judgment a reality that is both actualized now and expected to come. The Christian lives these two aspects simultaneously, 'superposed' as it were, so that present and future coalesce in Christian life as a non-local state of being that is both 'now and then'. The eschatological *nun* thus defines the existential state of Christian life: past, present, and future 'collapse', as it were, into an actualized 'eternal *now*'.

Another example of a parallel—an analogy or similitude—between certain aspects of quantum theory and Christian faith concerns the nature of the Church. In the faith and experience of Orthodox Christianity the Church is both a cosmic reality and an earthly institution. Many Eastern theologians hold that the Church in its very nature is transcendent, even pre-existent relative to the rest of creation. The early Christian text *The Shepherd of Hermas*, declares that the Church 'was created before all things and it was for her that the world was made'. In this perspective the Church is 'the life of the Holy Spirit' throughout visible and invisible reality (to use

an image favored by the Russian theologian Sergei Bulgakov). It manifests itself on earth, in our experience, as an institution, with hierarchical structure, various ministries, and a 'local' presence in the form of parishes, monasteries, hospitals, and the like. But in its essence, the Church is a *non-local*, living source of 'new life', 'life in Christ', whose purpose is more than 'to increase love for God and neighbor' (as the eminent Protestant theologian H. Richard Niebuhr defined it). It is that, certainly. But its primary function or raison d'être is to foster creation of what the apostle Paul calls 'the new human being', a new creation in and by the Spirit. It is in and through the universal Church that human persons are changed into the likeness of the glory of the Lord (2 Cor 3:18), changed from our 'lowly body' to be like the 'body of glory' of Jesus Christ (Phil 3:21). By means of its proclamation of the Word of God, through its gift of sacramental grace, and by its witness of love throughout the world, the Church exists and labors for the salvation of all humankind.

Yet, as we well know, the Church is also 'institution' in a less than exalted sense. As a human organization it is marked by sin and corruption. Many of those who are ordained with the purpose of leading others to new life in Christ are guilty of the sinful abuse of their authority. Often the Church, or rather its leaders and faithful, have played hand in glove with corrupt governments, or have turned a blind eye to atrocities that it could and should have denounced, publically and furiously. The Church is also a locus of demonic activity. 'The Devil enters the church through the choir', an old adage goes. In fact, demonic influence makes its presence felt at every level of ecclesial life. And yet the Church remains Holy. Once again, two states coalesce in a correspondence, a superposition of institutional banality and corruption on the one hand and cosmic glory on the other. Western theologians have long argued about whether the Church is 'Institution' or 'Event'. Here, too, it is both: both visible, hierarchical organization and invisible source of grace and life. It requires institutional form and structures; but the Church is ultimately the 'event' of Christ's enduring presence and the sanctifying activity of the Holy Spirit. In strength and weakness, in sin and sanctity, the Church is a universal, 'non-local' reality that fills the universe and directs all things toward the single end of eternal life.