Brain Physics of Sleep and Memory

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Abstract

Iodine nuclei in brain cells store memories, in this theory. Sleep time is used by animals so that neutrons are influenced by proteins to prepare for a future memory or to keep the old memory. Memory is not about nerve cells growing or changing their interconnections of dendrites. Human memory is stored in neutron spins. Those neutrons are in nuclear adiabatic zones that are resources for a diverse class of technologies.

Highlights of this Theory of Sleep

The brains of animals use sleep to slowly refresh old memories in iodine nuclei and to prepare iodine nuclear neutron spins for future memories. A protein that is near an iodine atom theoretically forces an electron to enter the nucleus and emerge from the other side. Each chemical element has available The Static Nucleus Theory of the Face-Armored Cubic Lattice [1]. That defines the shape of the nucleus, the neutron positions, and the positive charge distributions. A second electron enters the other side of that iodine nucleus and, when it encounters the flux from the first electron, a spin handshake is done or re-tried. That verifies the two flux spins to be oriented to the non-bonding positions, so they can remain in contact without making a bond. A neutron spin can be influenced by the spins of two lines of flux, if they are in contact. That flux spin handshake occurs in the cubic core of the iodine nucleus. Conversely, a neutron spin can drive an electron flux-pair-spin so it changes. That spin transfer enables an animal to remember something in its brain or in a muscle-memory nerve. The neutron memory easily provides read-write operations in animal brains and nerves in limbs. Each neuron might employ a hundred iodine atoms for memory contexts from variable perspectives. There are about ten million iodine atoms in some nerve cells. This theory of sleep physics is in a class of phenomena, including the shape memory alloy effect, the magnetocaloric effect and the ferromagnetic property.

Prior Art

Researchers have proposed that brain memory was a quantum effect and that sleep protected some memories and cleaned out some of the memories to make space for new memories. Sleep was next to consciousness in philosophy and in time. A coma seemed like a spectrum of sleep and wakefulness. Forgetfulness was like amnesia. A forgotten memory could be easily remembered without effort or without a planned context. Memory seemed to involve brain cells. The hippocampus was identified as being a place for some memories. Dreams were easy to forget or remember. A mental executive function seemed to exist, regardless of there being few memories or many memories.

Summary of a Theory of Sleep

Each biological neuron cell has about a million iodine atoms. A few of those iodine atoms store memory spins in neutrons. An electron can enter into the nucleus of that atom when an adjacent protein molecule provides that electron. This nuclear brain function is similar to the nitinol shape memory metal, which is a nickel alloy. The shape memory is in neutron spins in nickel. Ni-58 has two smooth rings of protons and I-127 has two rough rings (Fig. 1). These rings are resources that can be relied-upon for brain memory, brain sleep, the ferromagnetic property, and shape memory. A ring of protons with a current can capture nearby electrons and flux, accepting them into the nuclear core. A line of flux is a durable belt connecting each electron with one proton. When flux is in a nuclear core, it has intimate contact with the neutrons' spins. This is where the powers of quantum phenomena directly communicate spin states. Electron spins are communicated to the neutron and a change can occur in a spin. A long time can be used to train a neutron spin. Cold-rolled NiTi alloys also get heat-treatments of a hundred hours, so neutrons get trained to spin the way a flux-pair-spin is teaching. It is possible that martensite and austenite crystallographic lattices are influenced by trained neutron spins.

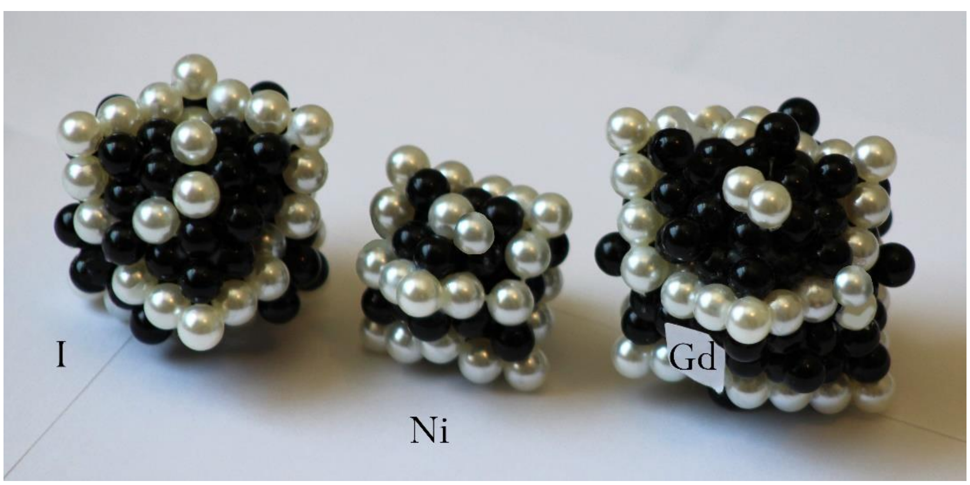

Figure 1: Mock-ups of iodine, nickel and gadolinium; white proton and black neutron beads

The proton distributions in all elements are based on The Static Nucleus Theory of the Face-Armored Cubic Lattice [1]. That theory was written in 2017 for iron-57. Proton ring currents in iron are DC (direct current). Ring currents in iodine are expected to be AC (alternating current). Radio frequency (RF) involvement of electrons [15] was used in lab experiments. My idea is that proteins can read and write I-127 nuclear spins, instead of using radio antennas and light beams. Other scientists [22] communicate spins in a burst, with double signals. This may be related to my theory with two sides of the nucleus being accessed in a slow sequence. Ferromagnetism uses two sides of a nucleus for north and south magnetic poles. This is a shared resource for several phenomena that use electrons to sequentially penetrate the nucleus [75] under the influence of nearby external sources.

The theoretical shape of the iodine-127 nucleus is shown in Fig. 1. The ring of protons can respond to an electron from a protein so the protons guide the electron into the middle of the nucleus. When an electron passes through the core of the nucleus, its flux comes into contact with other magnetic lines of flux. The inserted electron also touches neutrons. The spins of electrons and neutrons can be categorized as *meshing or clashing*. Alternatively, a functional naming system could call the two relative spin orientations *sliding or bonding*.

The I-127 nucleus is where a memory is stored as a neutron spin. One atom can hold several bits of quantum spins for later use. Imagine several proteins surrounding one iodine atom (Fig. 4). Two or eight proteins may be common to influence one atom from "perspectives". This can provide "context" for a memory spin. A context may be about urgency, or family, or for later. The physical positions of proteins may be in a chain from a remote hemisphere of a brain. That chemical chain is not changing for memory changes in neutrons. The perspective for the chain is for the executive mental function to assemble the memory from bits using context. Multiple perspectives converge on one atom of iodine, so it contributes storage to several ideas. The memory in that atom is given context using one chain and oversight by the executive. Concentration is real in the mind, as a spin can be examined from several perspectives.

The training of a neutron is a process that shares a nuclear resource. Several phenomena train neutrons. Trained neutrons are proposed to influence the hysteresis curve of an iron magnet as the first ten cycles of AC are applied. Training of elastocaloric nitinol with cold-rolling and slow heat treating is training neutrons. That means a path in a nucleus is repeatedly used for a flux to enter and withdraw, so after ten cycles, the neutron spins guide the new flux as it is inserted. For the ferromagnetic property, this establishes an "easy direction" for future magnetization sequences. This could result in a high-temperature digital memory chip. The core is insulated from many electronic phenomena. The cubic core is an adiabatic zone. The isolation in the center of an iodine nucleus enables the possibility of a tranquil state of mind.

Cubic Core Zone Properties

The proton rings in iodine use AC and the proton rings in nickel use DC. Electron control of nuclear spin [15] is done with two RF (radio frequency) stimulations. Quote, “multipulse sequences on the electron spin that resonantly amplify the interaction with a selected nuclear spin and at the same time dynamically suppress decoherence caused by the rest of the spin bath.” Other quantum tests used double decoupled RF control for a nitrogen atom [22]. The precise positions of all neutrons are known in all chemical elements.

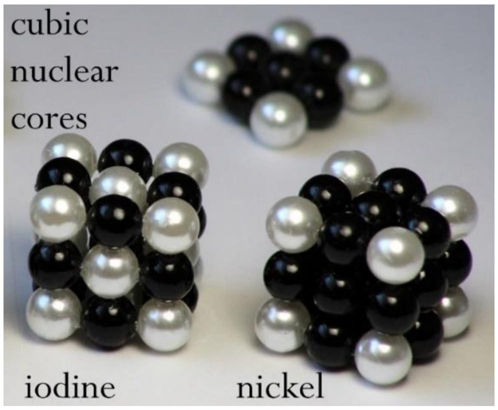

Figure 2: The Static Nucleus Theory of the Face-Armored Cubic Lattice has cubic nuclear cores in elements beyond boron

The rules for nuclear shape were already explained [1]. A law of physics is that protons make lines of protons. Most elements have a 3-layer cubic lattice of protons and neutrons. Fig. 2 shows the cube in the iodine nucleus next to the cube for nickel. There are 14 white beads in the model to represent protons in iodine. It has 13 neutrons in the cube. The spins of neutrons use three dimensions, but some figures later simplify that to the spins being clockwise or counter-clockwise (CCW).

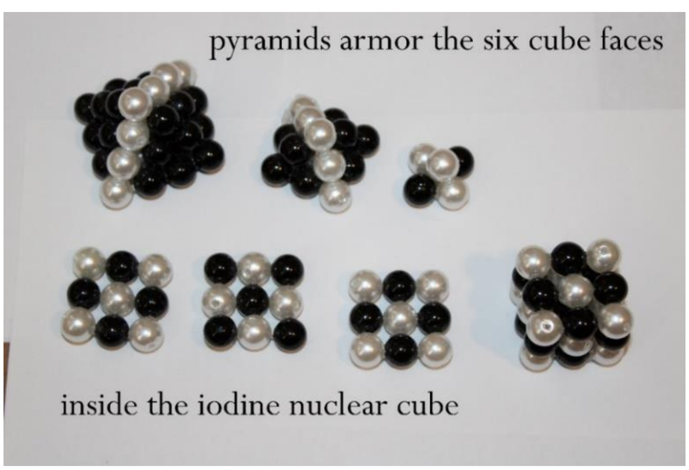

Figure 3: Each cube has six faces. Pyramids armor the faces.

The interior of the cubic core of iodine is shown in Fig. 3, Protons do not touch protons in the cube. Outside the cube, protons can touch. Iodine uses three-layer pyramids to make armor over each face of the cube. The figure shows three pyramid sizes: 4, 3, and 2-layer pyramids. Black neutron beads are used. This cube is for survival of the isotope because the outer surfaces are mostly hexagonal close-pack in many chemical elements.

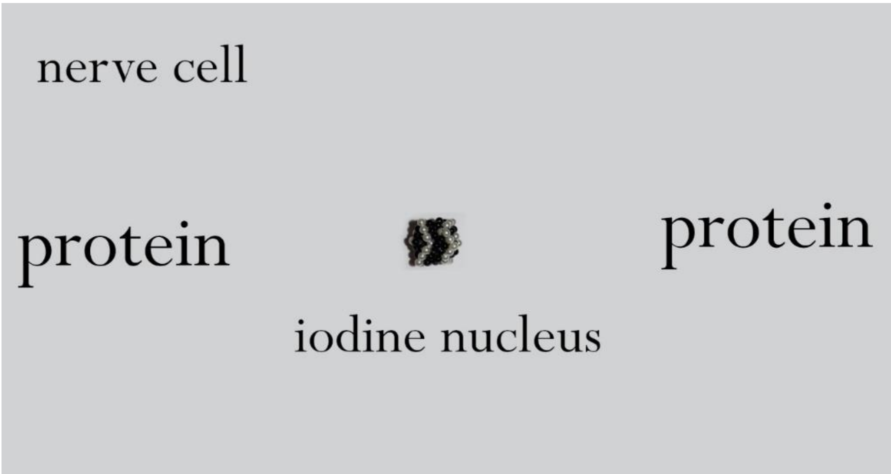

Figure 4: nerve cell physics of sleep, instinct and memory, electrons not shown

A nerve cell memory is illustrated schematically in Fig. 4. “Nerve cell” is written at the top to indicate that the entire figure is intended to represent a simplified sketch. Each cell has a million iodine atoms, but only one is shown here, without electrons being visible. Two proteins flank the iodine atom so they are in positions to insert an electron through the nucleus. There are thousands of proteins not shown. Some proteins insert and withdraw flux for sleep but when awake, possibly, different proteins are used to read and write memories in the neutrons.

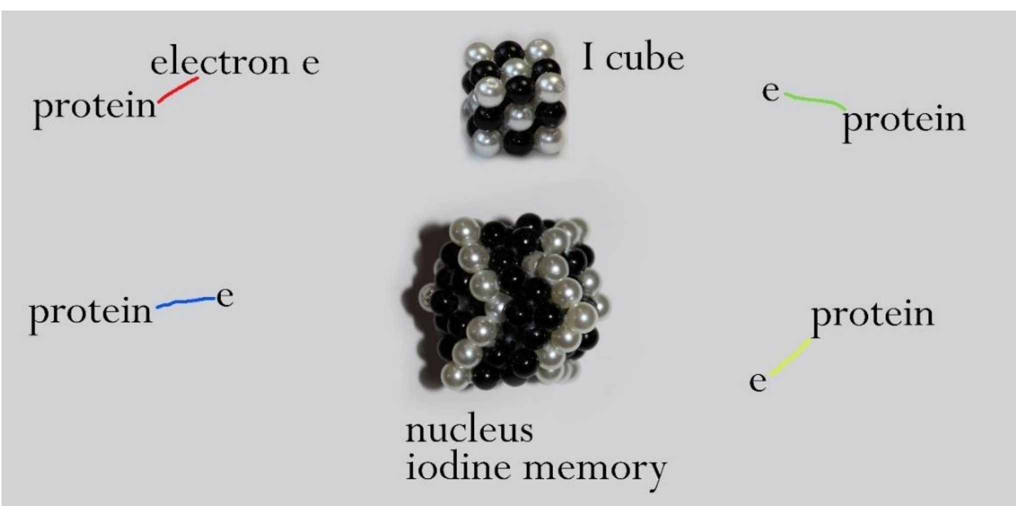

Figure 5: Close-up of the iodine nucleus, a cube, and four protein molecules

Four protein molecules are shown in Fig. 5, next to the cubic core of an iodine nucleus. Also, the whole I-127 nucleus is shown at the bottom. White beads represent protons. In Fig. 5, there are four electrons (e) with colored lines of flux. The line implies an electron connected to a proton in a protein molecule.

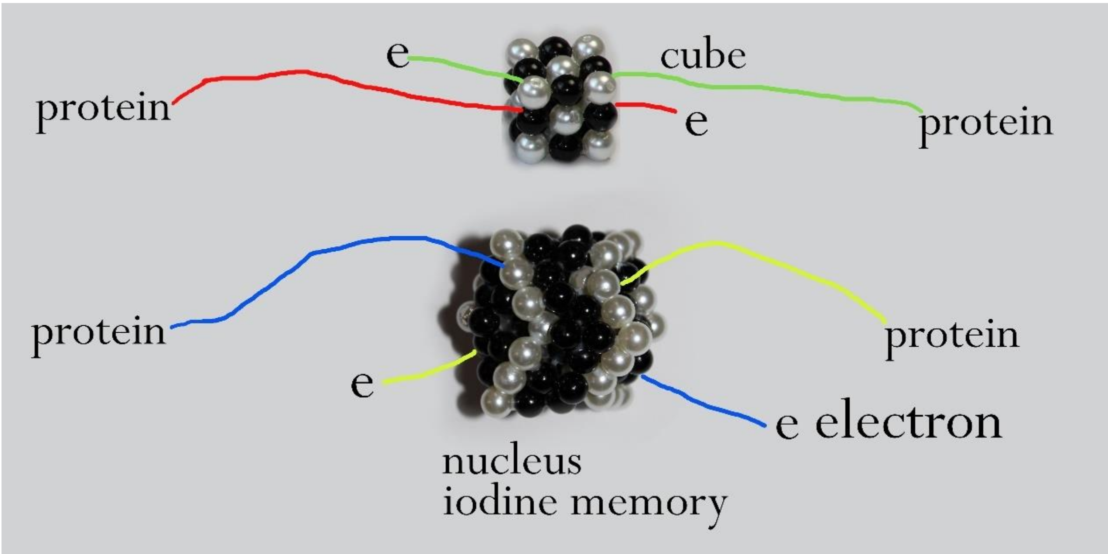

Figure 6: Flux was inserted through two nuclei. Flux is a wave function.

The protein at the top right of Fig. 6 has sent an electron through the cube of a nucleus and a green line of flux shows a history of where the electron has been. The electron's green line is like a lamination with no thickness to mark its territory. It is a real conveyor-belt. The other three protein molecules also sent electrons to penetrate the iodine nuclei. The interior neutron-electron interactions are not seen in this figure.

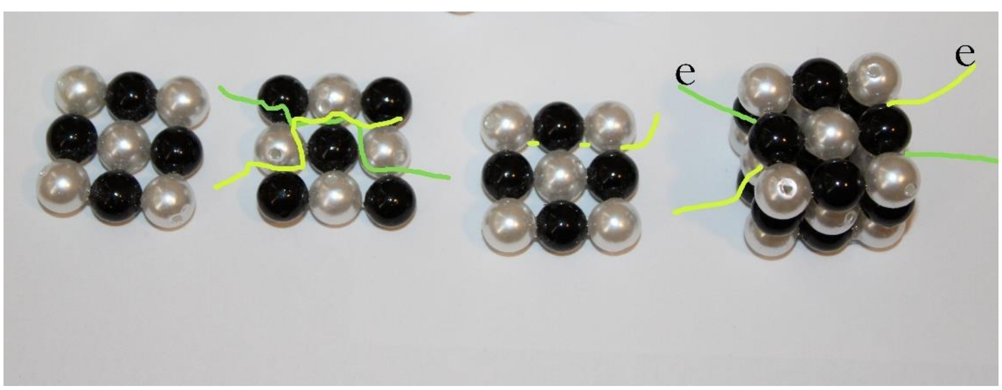

Figure 7: The interior of the iodine nucleus during memorization

Two electrons are shown in Fig. 7. A dark green line of flux is drawn from a protein to an electron. A different line of flux is drawn from a protein (not shown) to the second electron. Flux is a real history of where the electron went. It is the wavefunction. The electron passed through the nucleus and exited the iodine nucleus for Fig. 7. Fig. 8 has a protein labeled. The function of the proton in the protein is to send the electron to iodine to communicate with neutrons.

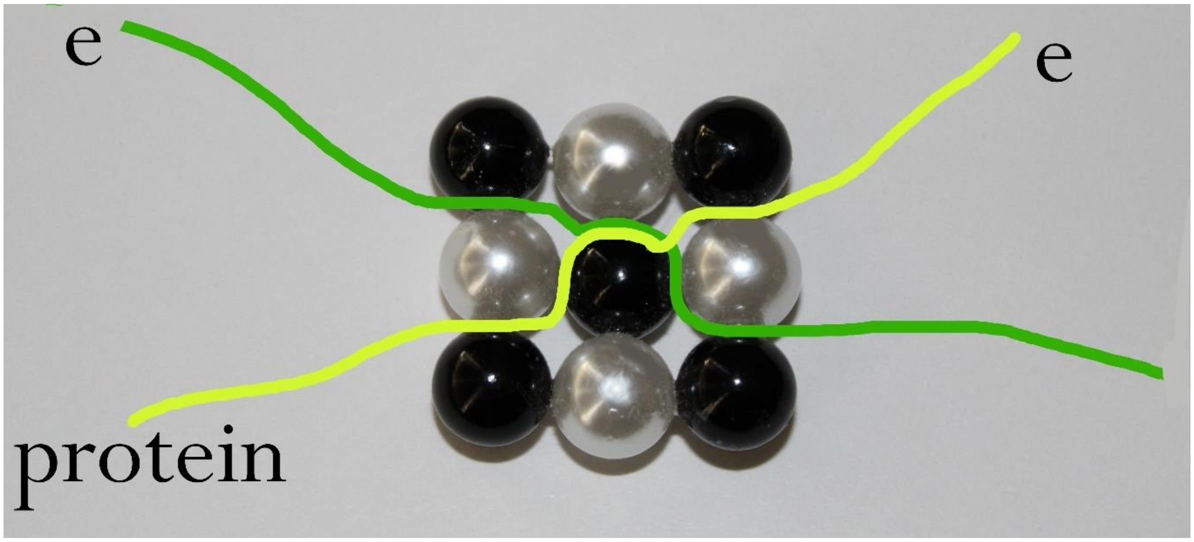

Figure 8: inside the nuclear core, quantum spins make contact, allowed by proton rings

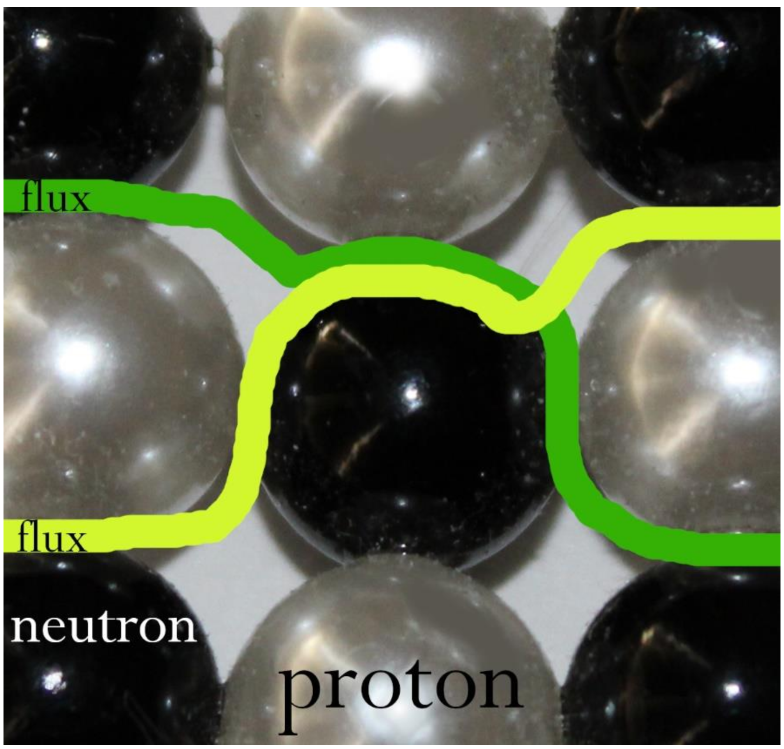

Figure 9: Black neutrons touch flux of electrons for a long-time during sleep, or during the magnetization dynamics of nickel

As illustrated in Fig. 9, flux belts from two proteins are delivering sleep properties to the central neutron. That refreshes memory spin bit or makes it imminently writeable. During this long time, conscious properties cannot be utilized. Waking up from sleep will let the flux withdraw from this atom. Then memory can be recalled quickly using a different set of proteins that are near the iodine.

Figure 10: multi-phenomenal handshake for quantum spin communications in I or Ni

The adiabatic zone in the core of iodine or nickel has the ability to house the quantum flux spin handshake (Fig. 9 and 10). That places a neutron in contact with two laminae of flux that connect two electron-proton pairs. The protons are in two protein molecules and the electrons were sent to penetrate the iodine. Iodine uses AC signals for memory read-write cycles. Nickel uses DC signals like cold-rolling for memory metal. Here are the typical metallurgical processing steps [70] used to make a titanium-nickel-based shape memory alloy for elastocaloric products:

1. Melt
2. Hot forge
3. Cold roll
4. Heat treat
5. Anneal at 500 degrees for 30 minutes

In Fig. 10 a black neutron has a clockwise quantum spin (CW). A light green line of flux touches the neutron and it has the CCW spin (counter-clockwise). A dark green line of flux touches the other line of flux, and it has the CW spin. This spin organization is there after a successful spin handshake, so the lines slide over each other, without bonding. If a line of flux had the wrong spin, a bonding would begin, but it would fail to bond in that small zone.

Memory Context

Each neuron can employ a hundred iodine atoms for memory contexts from variable perspectives. The intersection of several chains of proteins lets electrons sequentially enter the iodine nucleus. The neutron spin guidance gives communications with the electron evaluation. A spin-handshake was proposed for a ferromagnetic property and brain action also uses that.

After the spins of two lines are contacting a neutron spin, this trains the neutron to keep that spin. The lines of flux can withdraw from that iodine atom. Later, more flux can try to handshake inside the adiabatic zone. The trained neutrons will guide the new flux into the same positions that had trained the neutron. This allows a memory function. A related reference is about selective phase-controlled driving of nuclear spins interleaved with decoupling sequences on an electron spin [40]. That uses isolated tin atoms in a diamond. The dissertation by Dr. Hans K. C. Beukers is like that reference. It is entitled "Quantum Networks with Diamond Color Centers, Local Control and Multi-Node Entanglement". See [36] to read the PhD. Dissertation at Delft University of Technology. Three materials used quantum values at cryogenic temperatures:

1. Nitrogen vacancy NV electron spin in diamond, read optically
2. Carbon-13 nuclear spin in diamond, added Qubits near NV
3. Tin vacancy SnV electron spin is resilient against noise on surface of diamond

Tin has a nucleus that is very similar to iodine in its shape. Sn-120 has the same shape of its proton rings as I-127. CI_4 is a solid material (carbon tetra iodide) at room temperature.

The mental executive function neurons are connected on various paths to memory neutrons. Neutron spins that were trained can function to guide a protein to be in the chain of molecules, for a perspective. That gives context for the exec to gather with the target memory spin. For the executive cells to go through a chain of proteins to reach a memory, reading is easy for paths that have been written. Writing a memory makes it easy to read. In other words, the executive nerve function makes paths through molecules, not only by chemical growth, but also by neutron spin guidance through iodine nuclei. Quantum spins of neutrons and electrons are capabilities that include up, down, CCW, CW, and bends in the wavefunction. Bends are made in lines as they go around protons and neutrons in the cube, emerging from one of six faces. Directional neutron bends, of the lines of flux, are used in shape memory alloys and in nerve cells that make geometric chains of paths for read-write operations.

The executive nerves are not in contact with all memory spins simultaneously. That allows mental concentration that ignores distractions. Human focus of attention is geometrically using paths that are not near distracting events in nerves. Steering into alternative paths of proteins can use neutron habits. This gives quick flexibility for intelligent people, without chemical changes. It is a quantum utility.

Sleep Stasis

The sleep time span is long, like a heat-treating process or a shipyard dry-dock project. The molecules of memory are abundant in a cell and their functions can be active or sleeping. Most of the neurons in a body are given maintenance simultaneously during sleep. Sleep occurs in a way that is analogous to a ship that is using a dry-dock so maintenance can be done by surrounding proteins. A fluid surrounds the ship, but sometimes the fluid is drained out, revealing access ports for memory maintenance at low tide. All ships are affected, like most biological cells can be affected by the presence or absence of a fluid. A systemic fluid pressure may be involved to empty the dry-dock to enable maintenance by a crew of proteins. The spinal fluid can provide cycles of negative and positive pressures in the cerebral ventricles and spinal column. That is during sleep, and an animal is usually laying in repose. Some nerve cells enter a stasis state and some keep the active state. The mental executive function is made from neurons and sleep often de-activates that function so neutrons can have the spins controlled in iodine.

Sleep does not primarily result in a change in chemistry. The neutron spin memory for consciousness and instinct does not need a changed connectivity of several neuron cells. The sleep is done without a goal for chemical changes. Sleep achieves a goal of nuclear spin changes. Without that nuclear maintenance for hours, brain fog is common. Also, without enough iodine, brain fog occurs. With deep sleep, most neurons are busy building up an old state or readying a state to record a future memory. Those cells cannot be conscious during maintenance. Hours are spent ignoring the usual agitations. A ship in drydock cannot do its job and a nerve in sleep cannot be reliable for the executive mental function.

Flux lamination remains in the core while the electrons have departed to remote locations. The flux laminae can be extracted from the core, and the neutrons there will retain the spin state. It is an adiabatic zone in there.

Calculate Memory Capacity

An estimate is made of how many quantum spins can be stored. A minimum and maximum calculation is done.

1 to 13 neutrons available in each iodine core cube

1 to 1000 iodine atoms employed in a nerve cell out of 1,000,000 available

A billion brain cells might hold a billion accessible spin states for instinct and memory or up to 13 tera-states, multiplying those estimated numbers 13 and 1000. A human brain has about 100 billion neurons, so a brain could have a quadrillion bits.

Memory is not nerve-cells growing. Memory is in iodine neutron spins that proteins read and write. Nerve cells remember and sleep in fingers, spines and brains. Insulated zones inside nuclei hold the keys to understanding.

Phenomena related to the sleep-physics theory

- Shape-memory alloy
- Elastocaloric training of neutron spins [70]
- Ferromagnetic hysteresis and coercivity
- Flux confluence zone in coercivity theory [75]
- Cold-rolled alloy flux insertion
- Paramagnetic flux extraction is free labor
- Magnetoelastic
- Magnetocaloric [80] adiabatic zone
- Conservation of bends in the wave function (line of flux)
- Quantum Brain Theory [90]

Shape-memory alloy: The neutron spins in nickel are controlled during times when a high temperature drives electrons into the proton rings of the awaiting DC vortex. In sleep, the local temperature is not driving electrons into a ring, a protein chemical potential drives the electron into a proton ring at RF. The segmented ring in I-127 resonates at the RF. Nitinol has nickel but this alloy is not ferromagnetic. The proton rings guide electrons that were driven by mechanical forces.

Elastocaloric training of neutron spins: The slow metallurgical processes of cold-rolling and heat treating and annealing give the neutrons time to adapt to the flux incursions.

Ferromagnetic hysteresis and coercivity: The first time a freshly solidified nickel bar gets magnetized, the neutrons are not yet trained to have any particular spin. On the second pass through the north magnetization changing to a south magnetization, the hysteresis curve is different from the first loop. Each time the poles are reversed for magnetization, neutrons retain some training. Some neutrons are trained for north-related paths for electrons to pass through the nucleus. Other neutrons in that Ni atom are trained for south-related paths for electrons to prefer. Those paths cause magnetic anisotropy and an easy direction of magnetization. After many cycles of magnetization reversal, the hysteresis curve stabilizes to reflect the neutrons that were trained. Neodymium is added to iron to improve magnetic coercivity. That improvement is due to Nd having more protons in the cube that does iron. Those protons constrain which paths that flux can follow, so it is harder to reverse the polarity.

Flux confluence zone in coercivity theory: The ferromagnetic elements Fe, Ni, Co and Gd have a surprising phenomenon where north pole electron eddy currents are driven by the protons on the south end of the nucleus. The south pole electron eddy currents are driven by the protons on the north end of the nucleus. Therefore, the 12 north flux lines cross paths with the 12 south flux lines. This is called the confluence zone. See videos and photos in [75] of this geometric organization that is required to produce the ferromagnetic property.

Cold-rolled alloy flux insertion: The production of some magnets and ferroic materials uses cold-rolling mechanical processing. This is slower than magnetic fields can change and faster than a brain getting trained. The cold-rolling forces lines of flux to enter the cores of nickel or iron atoms.

Paramagnetic flux extraction is free labor: Above the temperature of the Curie point, iron is paramagnetic. Flux gets retracted from the nuclear core so the ferromagnetic property is disabled. This is a free process, like a spring relaxing after it was externally forced to be bent. Magnetocaloric alloys and elastocaloric alloys have compositions that set the Curie point to be near a target temperature, like room temperature. That empowers the ability to retract and insert flux easily.

Magnetocaloric adiabatic zone: Books on the magnetocaloric effect [80] feature algebra about entropy and heat flows. Consider a line of flux that is partially inside and partially outside the cubic core zone. The line can have two sections that add up to a total entropy magnitude.

Magnetic Entropy + Lattice Entropy = 2 parts of a line of flux

Inside the cube is an insulated zone for magnetic entropy to have a magnitude of orderliness. Outside the cube, for example, there could be a more disordered zone with the lattice entropy. Assume the entropy of one line is unchanging during a test. When a cold line enters the nuclear core, the trained, hot-like neutrons, can change the orderliness of the line part. If the interior has a “hot neutron spin” the exterior part of the line will get colder. That cools the lattice for refrigeration.

Conservation of bends in the wave function (line of flux): A line goes from an electron to a proton. The note above, about adiabatic lines of flux, can be generalized into a trend for dynamic atomic phenomena. A line of flux is also called a wave function or a magnetic line of flux. This conservation trend enables magnetic refrigeration.

Trend: "The bends in a line of flux are conserved, so if a part of the line becomes more orderly, the other section of the line becomes more disordered."

Quantum Brain Theory: The long history of biological cells has some evidence [99] that iodine was used in plants and animals two billion years ago. The theoretical use of iodine in this paper does not preclude the possibility that other heavy chemical elements, in biology, keep memories in neutron spins. The human thyroid hormones use iodine. $C_{15}H_{11}I_4NO_4$ is the chemical formula for one thyroid hormone. Thyroxine and triiodothyronine are names of some of those hormones. Thyroid hormones deliver iodine into vegetables [99] and animal neurons.

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