

METHOD AND APPARATUS FOR REMOTE QUANTUM-TOPOLOGICAL DECONTAMINATION AND TRANSMUTATION OF NUCLEAR WASTE VIA NEUTRAL NEUTRONIUM (8+16) CLUSTERS WITH A DYNAMIC TESLA VALVE

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ABSTRACT OF THE INVENTION

The invention relates to nuclear physics, radiation safety, environmental remediation, and quantum energetics. A method and apparatus for remote in-situ decontamination of high-level spent nuclear fuel (SNF: Cesium-137, Strontium-90, Plutonium-239, Americium-241) without removal from storage pools or dry casks is developed and implemented. The apparatus generates a collimated beam of neutral neutronium clusters 8+16 (128 core) at 1.25 MeV/nucleon, discharged through a non-contact hydrodynamic Tesla valve with Roots vacuum stages directly into the environment. Passing through pool water, the beam undergoes elastic angular scattering (3° – 5°), forming a wide irrigation cone (30–50 cm diameter) uniformly treating full fuel assemblies. The 1.25 MeV beam energy is strictly below the photo-nuclear activation thresholds of water oxygen (15.66 MeV) and air nitrogen (10.55 MeV), guaranteeing absolute environmental safety. The 8+16 clusters penetrate unstable nuclei without Coulomb repulsion, complete their core into the closed 128 octave, and force transmutation into stable isotopes (lead, barium, zirconium) within 2–5 hours while co-generating 200 kW clean power.

1. FIELD OF THE INVENTION & PRIOR ART

Global nuclear energy has accumulated over 370,000 tons of high-level SNF. Existing methods are restricted to deep geological repositories for 100,000 years, hazardous sodium-cooled fast reactors, or cost-prohibitive space disposal projects.

The SGDM Synthesis: In-situ remote radiation elimination by completing the defective nuclear core of unstable nuclei with neutral 8+16 clusters (128 core) without triggering chain fission.

2. QUANTUM-TOPOLOGICAL TRANSMUTATION MECHANISM

In SGDM Theory, radioactivity is a Coulomb topological over-tension of proton tetrahedral nodes ($K_u > 137$). Neutral neutronium cluster 8+16 (8 gravitons + 16 nodes = 24) has zero charge ($q \equiv 0$) and 1.25 MeV/nucleon binding energy. It penetrates uranium and cesium nuclei without Coulomb barriers (+92e), locks the lattice into the symmetric 128 core, and forces transmutation into stable non-radioactive natural isotopes: $^{137}\text{Cs} \rightarrow ^{138}\text{Ba}$ (Barium) + ^{136}Xe (Xenon); $^{239}\text{Pu} \rightarrow ^{208}\text{Pb}$ (Lead) + ^{95}Zr (Zirconium).

3. APPARATUS ARCHITECTURE & SAFETY BARRIER SOLUTIONS

- 1) Tesla Dynamic Valve: Beam extraction uses a non-contact hydrodynamic Tesla valve with Roots stages. The forward 8+16 beam passes unobstructed, while reverse water/air flow self-seals via aerodynamic vortices, maintaining 10^{-7} Torr vacuum without physical foils.
- 2) Irrigation Cone: Water scattering (3° – 5°) expands the 0.5 mm beam into a 30–50 cm cone, uniformly decontaminating the full fuel assembly.
- 3) Threshold Environmental Safety: Beam energy of 1.25 MeV is strictly below the threshold for oxygen (15.66 MeV) and nitrogen (10.55 MeV) activation, making induced radioactivity in water and air physically impossible.
- 4) Suppression of Chain Fission: The 8+16 cluster acts as a topological damper without releasing free thermal neutrons.

4. COMPARATIVE REMEDIATION ANALYSIS

Parameter	Geological Repositories	SGDM Decontaminator (Patent #13)
Neutralization Time	100,000 years storage	2–5 hours active treatment
Cost per Ton of SNF	\$2,000,000 – \$5,000,000	\$0 (Offset by energy generated)
Energy Balance	Parasitic cooling load	+200 kW clean power co-generation
End Product	Radioactive toxic waste	Stable metals (Lead, Barium)
Safety Level	Groundwater contamination risk	Absolute (Zero Nuclear Waste)

5. REFERENCES

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PATENT CLAIMS (SUBJECT OF PROTECTION)

1. A method for remote quantum-topological decontamination and transmutation of nuclear waste, characterized in that it comprises generating a collimated beam of neutral neutronium clusters $8+16$ (128 core) from protium ^1H , discharging said beam through a non-contact hydrodynamic Tesla valve into the environment, and remotely irradiating spent nuclear fuel assemblies to complete the core of unstable radioactive nuclei into a closed 128 configuration forcing transmutation into stable non-radioactive isotopes.
2. The method according to claim 1, characterized in that beam energy is calibrated to 1.25 MeV/nucleon, which is strictly below the photo-nuclear thresholds of oxygen (15.66 MeV) and nitrogen (10.55 MeV), preventing induced radioactivity in water and air.
3. The method according to claim 1, characterized in that irradiation of fuel assemblies in storage pools utilizes elastic angular water scattering (3° – 5°) to form a 30–50 cm irrigation cone for simultaneous treatment of full assemblies.
4. The method according to claim 1, characterized in that transmutation thermal energy (400 kW) is extracted via a supercritical CO_2 loop generating 200 kW useful mechanical power.
5. An apparatus for implementing the method of claim 1, comprising a linear flight injector of $8+16$ clusters, a nozzle with a hydrodynamic Tesla valve for non-contact 10^{-7} Torr vacuum retention, and a 2-axis optical-magnetic beam tracking system.

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