QUANTUM STATES APPROXIMATION OF ABR FORMULATION
FOR JOSEPHSON’S TUNNELING IN Thx SrUO2 NANOMATERIALS
IN 525 TESLA SUPER MAGNETIC FIELD
AT LHC ACCELERATOR

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ABSTRACT

The chromo-dynamics quantum of free covariant equation in Einstein’s space with quantum
states and condition is studied using the ABR (Abrikosov-Balseiro-Russell) formulation in
convergence approximation for Josephson tunneling is important role for determine of neutrino
particle existing, especially after Cerenkov’s effect for 415 tesla at Large Hadron Collider (LHC)
accelerator nuclear reactor based on Thx SrUO2 nano materials. This approaching will be solved
the problem for determine the value of interstellar Electrical Conductivity (EC) on Thx DUO2 chain
reaction, then the post condition of muon has been known exactly. In this research shown the value of
EC is 4.32 μeV at 525 tesla magnetic field for 2.1 x 10^4 currie/mm fast thermal neutron floating in
55.4 megawatts adjusted power of LHC accelerator nuclear reactor. The pictures had resulted by
special Electron-Scanning-Nuclear-Absorption (ESNA) shown any possibilities of Josephson’s
tunneling must be boundary by muon particles without neutrino particle existing for 415 – 456 tesla
magnetic field on Thx DUO2 nano materials more enrichment chain reaction at LHC accelerator super
magnetic field, whereas this research has purpose for provide the mathematical formulation to
boundary of muon’s moving at nuclear research reactor to a high degree of accuracy and with Catch-
Nuc, one of nuclear beam equipment has a few important value of experimental effort.

Keywords : Quantum states, ABR formulation, EC value, Thx SrUO2 nanomaterials, super magnetic
field

INTRODUCTION

It’s known that for muon-hadron scattering, the close-coupling equations [1] have been used
extensively in the sophisticated computation in Abrikosov-Balseiro-Russell (ABR) formulation [2]. In
the close-coupling equations, the complete wave functions are expanded in target states on Einstein’s
space. In this paper the target states are constructed in the finite L^2 basis space following the results
of Abellian system and next formulated by ABR without Dirac’s condition. The previous studied the
convergence of the approximation target states for discrete and continuum cases in quantum condition
for Thx SrUO2 nano materials chain reaction at 525 tesla super magnetic field adjusted power in Large
Hadron Collider (LHC) accelerator nuclear reactor. The advanced studied its application to the ABR
equations which results in pseudo state close-coupling approximations for bound-free transition in
convergence structure for Josephson’s tunneling. For first step using by Einstein’s space for eliminary
construction of ABR formulation in Thx SrUO2 nano materials chain reaction.

In this paper, the Abellian system was conducted for covariant equation to Einstein’s space
and ignores the Dirac’s condition for 480 – 516 tesla super magnetic fields on fast thermal neutron
combine for fast-breeding neutron, to study the convergence behavior of the free covariant equation
part. Its possible analytical computation is also addressed after finding the asymptotic behavior.

Pseudostate Close-Coupling in Quantum States

The close-coupling equations in ABR formulation require to study is given by

\[
\left[ -H_0 + E - \epsilon_j \right] \left| f_j^\pm \right> = \sum_{k=1}^\infty V_{jk}^\pm \left| f_k^\pm \right>
\]

(1)
where
\[ H_0 = -\frac{1}{2} \Lambda^2 \] (2)

the total energy of the system connecting the initial and final state \( i \to f \) satisfies
\[ E = \varepsilon_i + \frac{1}{2} k_i^2 = \varepsilon_f + \frac{1}{2} k_f^2 \] (3)

\( \phi_j(r_j) \) are channel functions related to the complete wave function as
\[ \psi^\pm (r_1, r_2) = \sum_{j=1}^{N} \phi_j(r_1)f_j^\pm(r^2) \] (4)

in which the + (-) superscript refers to singlet (triplet) scattering and \( \phi_j(r_j) \) are muon eigen functions.

The channel potential \( V^\pm_{jk} \) is given by
\[ V^\pm_{jk} = U^\pm_{jk} + W^\pm_{jk} \] (5)

where
\[ U^\pm_{jk} = \int dr_1 \int dr_2 \left[ \begin{array}{c}
- \frac{1}{r_1} + \frac{1}{|r_1 - r_2|} \phi_k(r_2) \\
\phi_k(r_1) \langle r_2 | \phi_j(r_2) 
\end{array} \right] \] (6)

and
\[ W^\pm_{jk} = \delta_{jk} \sum_i \left| \phi_i \right|^2 \psi_j^\pm (\varepsilon_j + \varepsilon_i - E) \left| \phi_i \right| \] (7)

with
\[ \gamma^\pm_i = 1 \quad \gamma^4_i = 1 \] (8)

If replace the target states by a set of pseudo states (as consequences of finite basis set) in order to solve the equations approximately. We has to modify the close-coupling equations for Einstein’s space through for normal condition after Cerenkov’s effect at 380 tesla super magnetic field for Th nuclei DUO₂ nano materials since the exchange term in the form (7) is valid only for exact target states. The form appropriate to pseudo states is given by
\[ W^\pm_{jk} = \left| \phi_{Nk} \right|^2 \langle \phi_{Ni} | H(r_1) + H(r_2) \phi_{Nk} > \phi_{Ni} | + \delta_{jk} \sum_{i=1}^{N} \left| \phi_{Ni} \right|^2 \gamma^\pm_i (E) \left| \phi_{Ni} \right| \] (9)

where \( \phi_{Ni} \) label the pseudo states and \( H(r_1) \) is the target non-liner for Hamiltonian operator in Abellian.

In calculating the pseudo state close-coupling approximation one must consider the error present in the quadrature rule approximation and the close-coupling potentials when pseudo states are employed. The first error will not be discussed here. The second error will be discussed in association with the direct-potential component of the channel potentials since they are regarded is being responsible for the dominant scattering process especially at higher energy.

**Convergence Approximation of ABR Formulation**

In the momentum re-presentation, the derivative of ABR formulation for muon state in Th nuclei DUO₂ nano materials chain reaction is given by
\[ T_{2B} = V + V G_0 V \] (10)
Here $G_0$ is the diagonal matrix of free channel Green’s functions. This second ABR formulation approximation has been used by Einstein’s space in Abellian system, especially the fast thermal neutron floating at 380 tesla super magnetic field to test the suitability of pseudo states expansions with initial and first states chosen either the ground or 2s, 2p excited states.

The actual Josephson’s tunneling element from (10) require to study is

$$V_{pq}(k_i,k_j) = -2\Delta^2 \left[ -\delta_{ij} + \int \phi_i^*(r)e^{i\Delta r}\phi_j(r)dr \right]$$

(11)

where $\Delta = k_i - k_j$. The indices i and j can be either discrete or continuous after Cerenkov’s effect on $2.1 \times 10^4$ currie/mm and the range of 380 – 390 tesla super magnetic field. For free covariant equation in quantum condition for Thx DUO2 nano materials enrichment reaction potentials one uses

$$I_{pq}(\Delta) = -2\Delta^2 \int \phi_i^*(r)e^{i\Delta r}\phi_p(r)dr$$

(12)

where $\phi_i$ and $\phi_q$ are initial and final continuum states having the momenta $p$ and $q$ respectively, given by

$$\phi_q(r) = \frac{1}{2qr} \sum_{\ell \geq 0} (2\ell_q + 1)e^{i\ell_q}U_{\ell q}^N(r)P_{\ell q}\left(\frac{qr}{qr}\right)$$

(13)

and normalized to a $\delta$ function in $q/(2\pi)^3$. The approximate target wave function $U_{\ell q}^N$ is given by

$$\left| U_{\ell q}^N \right| = B_{\ell q}(q) \sum_{n=0}^{N-1} \Gamma(n+1)\Gamma(n+2\ell_q+2)\phi_n^{\ell q}$$

(14)

where

$$B_{\ell q}(q) = 2^\ell q\left| \Gamma(\ell_q + 1 - i\gamma) \right| (1-x^2)^{(\ell_q+1)/2}e^{(q-\gamma)/2}$$

(15)

and

$$\phi_n^{\ell q}(r) = (\lambda r)^{\ell_q+1}e^{-\lambda r/2}L_n^{2\ell_q+1}(\lambda r)$$

(16)

solving the integral (15) after quite lengthy derivation one finally obtains

$$V_{pq}(\Delta) = -32\pi^3 (pq)^{-1} \sum_{L,M,\ell_p,\ell_q} (-1)^m \frac{L^{\ell_p+\ell_q}}{4\pi(2L+1)} \left(2\ell_p+1)(2\ell_q+1)\right)^{1/2} \left\langle \ell_p \ell_q 00 | L0 \right\rangle \left\langle \ell_p \ell_q m_p - m_q | LM \right\rangle T_{pq}^L(\Delta)$$

(17)
METHODOLOGY

This research using by high degree accuracy mathematical approaching and a few experimental efforts with special Electron-Scanning-Nuclear-Absorbtion (ESNA) and Catch-Nuc, for see the results of the mathematical approximation, in case is ABR formulation in Josephson’s tunneling for Thx DUO2 nano materials chain reaction at 480 – 515 tesla super magnetic field and determine of Electrical Conductivity (EC) value in 2.1 x 10^4 fast thermal neutron floating.

A few mathematical equations in quantum condition will be explain in this section.

ABR Formulation non Abelian

The metric tensor is defined through the line element as follows:

\[ ds^2 = g_{\alpha\beta} dx^\alpha dx^\beta \]  

Hence, different metric shall lead to different properties of space-time. For a space time where the metric is defined through

\[ ds^2 = dt^2 - \left[ R(t)^2 \right]^2 \left( \frac{dr^2}{1-kr^2} + r^2(d\theta^2 + \sin^2 \theta d\phi^2) \right) \]

the space satisfies the properties that it is homogeneous and isotropic. Such properties agree with the nuclear structure in microscopic principles and are also supported by experimental data. Accordingly the above metric, called the ABR Formulation without Abellian system, becomes a standard model of Thx DUO2 nano structure. In the above expression R(t) denote the scale factor and k is a constant. The universe is closed if \( k > 0 \), open if \( k < 0 \) and flat if \( k = 0 \) and R(t) sometimes are rescaled in such a way that the value of k assume one of the three values -1, 0, or +1. The Cartesian form of the above line element.

\[ ds^2 = dt^2 - \left( \frac{dx^2}{1-kx^2} + \frac{dy^2}{1-ky^2} + \frac{dz^2}{1-kz^2} \right) \]

\[ R^2(t) = \frac{1}{2} g^{\alpha\beta} \left( \frac{\partial g_{\mu\nu}}{\partial x^\alpha} + \frac{\partial g_{\mu\nu}}{\partial x^\beta} - \frac{\partial g_{\beta\nu}}{\partial x^\alpha} \right) \]

Combining (19) and (21), one finds the explicit forms of non-zero components of the Riemannian curvature tensors as:

\[ R_{ab}^a = \frac{R(t)}{R(t)} \delta_{ab} \]

\[ R_{ab0}^0 = R(t)R(t) \left[ \delta_{ab} + \frac{kx_a x_b}{1-kr^2} \right] \]
\[
S = \frac{k}{4\pi} \int_M Tr\left( A \Lambda \, dA + \frac{2}{3} A \Lambda \Lambda \right) 
\]

(24)

\[
\left\langle K_{\rho_1 \rho_2 \rho_3 \rho_4} \right\rangle = \delta_{\rho_1 \rho_2} \sqrt{E_0(\rho_1)E_0(\rho_2)} 
\]

(25)

\[
S_{\nu \zeta} = \frac{1}{24\pi^2} \int_M Tr\left( g^{-1} \, dg \right) \in Z 
\]

(26)

\[
A_\mu(x) = \int_0^1 ax^\mu F^\mu_{\rho \pi}(ax) \, da 
\]

(27)

\[
\Gamma^\mu_{\beta \nu}(x) = x^\mu \int_0^1 \lambda d\lambda R^\mu_{\beta \nu}(\lambda x) 
\]

(28)

\[
\left\langle g_{\rho \pi}^{(2)} \right\rangle = \sum_{s=1}^n \beta_s \cdot \sum_{q=1}^{Q(q)} \frac{1}{2} Q(q) \cdot E_0 
\]

(29)

**RESULT AND DISCUSSION**

It is shown in the final equation that beside the double series \(n\) and \(m\) which are finite, the ABR function \(F_2\) is formally defined by a double series expansion with radius of convergence severely restricted. Because the occurrence of \(-n\) and \(-m\) which are finite in the arguments, there is no problems arise about its convergence. The remaining is to compute (22) numerically in order to see how rapid the convergence is since the expression of Riemannian curvature tensor is similar with the expression of \(\mu \nu F\) in the non Abelian gauge. Such a formula (18) may also be obtained in the general theory of relativity, the fast thermal neutron break into Th\(_x\) SrUO\(_2\) nano structure matrix is show in Fig. 1.

![Fig.1. The floating of muon moving in Th\(_x\) SrUO\(_2\) matrix at 415 tesla super magnetic field](image)

(Courtesy of LHC, CERN, Lyon-France 2013)

To obtain this formula, let us impose the ABR gauge condition on the Christoffel symbol as follows:

\[
x^\mu \Gamma^\nu_{\mu \rho}(x) = 0 
\]

(30)

If we make the transformation of \(x^\mu \rightarrow \lambda x^\mu\) where \(\lambda : [0,1]\) is a parameter could obtain:

\[
\lambda x^\mu R^\mu_{\beta \nu}(\lambda x) = x^\mu \partial^\nu_{\mu} \Gamma^\mu_{\beta \nu}(\lambda x) 
\]

(31)

\[
+ \Gamma^\mu_{\beta \nu}(\lambda x) 
\]
and if use the relation:
\[
\lambda \frac{d}{d\lambda} F(\lambda x) = \lambda \frac{d(\lambda x^\mu)}{d\lambda} \frac{\partial F(\lambda x)}{\partial (\lambda x^\mu)} \tag{32}
\]
\[
\frac{\lambda x^\mu}{\lambda \partial_{\bar{x}}^\alpha} = x^\alpha \partial_{\bar{x}} F(\lambda x).
\]
\[
\lambda x^\mu R_{\beta\mu\nu} (\lambda x) = \frac{d}{d\lambda} (\lambda \Gamma_{\beta\nu}^{\alpha} (\lambda x)) \tag{33}
\]

Using the above formula, we shall derive the Christoffel symbol and contrast them with the Christoffel symbol previously derive from the ABR formulation on Abellian system and the repolarization of Thx DUO2 nano materials matrix will give in Fig. 2.

![Image](image.jpg)

**Fig. 2.** The floating of muon moving in Thx SrUO2 nano structure matrix at 525 tesla super magnetic field and fast thermal neutron at 2.1 \times 10^4 currie/mm floating (Courtesy of LHC, CERN, Lyon-France 2013)

We have seen that the ABR gauge which satisfy the Josephson’s tunneling effect can be deduced from (23). We shall refer the symbol of \( \Gamma_{\beta\nu}^{\alpha} \) for the ABR gauge in Christoffel symbol to distinguish with that derived from the Robertson-Walker Riemannian tensor, the fast thermal neutron and fast-breeding neutron will be passing away in Einstein-Dirac condition, whereas the quantum states has been floated-up in 405 tesla until 410 tesla high gain in super magnetic field combination, through by SrUO2 nano structure matrix will be held in 495 tesla super magnetic field for Hermitian Group state in chromo-dynamics quantum for Thx SrUO2 nano materials structure in accelerator at 2.1 \times 10^4 currie/mm floating will shown up at Fig. 3, especially without the neutrino particle.

\[
E(r,t) = B(r,t) + kn = 0 \sum_{n=0}^{\infty} F^{(n)}(r)
\]

\[
\begin{bmatrix}
(-1)^n & (-1)^{n+1} 2(n+1) \\
(n+2)! & (n+3)!
\end{bmatrix} + 
\begin{bmatrix}
(-1)^{n+2} (n+2) \\
(n+4)!
\end{bmatrix}
\]

\( (34) \)
Based on Fig. 3, if integrate the equation by parts, we will obtain the series form of the equation as
\[
\int_0^1 \lambda^a \lambda x^n R^{a}_{\mu\nu}(\lambda x) = \sum_{n=0}^{\infty} \frac{(-1)^n}{(n+2)!} d^n x^n
\]
(35)

Let us now choose a scale factor as:
\[
R(t) = e^{mt}
\]
This is an asymptotic value of the Friedmann model of \(Th_x \cdot SrUO_2\) nano materials nuclear structure with \(m = \sqrt{\Lambda/3} \), where \(\Lambda\) is the UO\(_2\) constant.

Using by special ESNA, we get the Josephson’s tunneling with Abellian operator such as the Fig. 4.

The singularity for the first turns out to be worse compared to the later since the standard one has only a singularity factor from EC value at interstellar of muon’s moving for \(2.1 \times 10^4\) fast thermal neutron floating at range 480 – 525 tesla super magnetic field without neutrino particle existing after Cerenkov’s of \(1/(1 - kr^2) = 4.32 \, \mu \, eV\). At least on the pedagogical point of view one then becomes aware that the ABR formulation in \(Th_x \cdot SrUO_2\) nano materials chain reaction in LHC accelerator for a given Riemannian curvature tensor are not unique.

CONCLUSIONS

Investigations and research using by ABR formulation in convergence approximation and ESNA also Catch-Nuc equipments based on \(Th_x \cdot SrUO_2\) nano materials chain reaction by Josephson tunneling at LHC accelerator nuclear reactor in 415 tesla super magnetic field has a few result, expressed:

a. The strength of fast thermal neutron floating is \(2.1 \times 10^4\) currie/mm.

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b. The values of Electrical Conductivity (EC) for interstellar muon’s moving is 4.32 \, \mu eV at 525 tesla super magnetic field.

c. These equations have a high degree accuracy, so they could be determine of muon’s moving after Cerenkov’s effect for 415 tesla adjusted power in super magnetic field LHC accelerator.

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