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Mukai-Fourier Transform in Derived Categories to Solutions of the Field Equations: Gravitational Waves as Oscillations in the Space-Time Curvature/Spin IV

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Starting of fact that the Mukai-Fourier transform is an equivalence of derive categories(with arbitrary decorations: $+, -$,b), is feasible construct a Fourier-Mukai equivalence given for

$$D_{Coh}(T^{\vee}A) \cong D_{Coh}(A^{\vee} \times \mathbf{H})$$

, where exist a distinguished deformation of the category $D_{Coh}(T^{\vee}A)$, which is a non-commutative deformation of $T^{\vee}A$, defined by a natural symplectic form, that is their quatization [1].

Then $T_o^{\vee}A$, results a 1-parameter deformation A^b, of the space $A^{\vee} \times \mathbf{H}$, to an affine bundle over $A^{\vee}$, classified by $H^1(A^{\vee}; \mathcal{O} \otimes \mathbf{H})$. Then the Fourier-Mukai equivalence relative to the projection $T_o^{\vee}A$, deforms an equivalence between the deformed categories $D_{Coh}\mathcal{D}_A - mod$, and $D_{Coh}(A)^b$.

Then we use the deformed version of the Mukai-Fourier transform that results on D_A- modules and we characterize to A, as a Picard variety of C, [1], where C, is a curve. Then a Hecke functor is definid as the integral transform

$$\Phi^1 : D_{Coh}(Pic(C), \mathcal{D}) \to D_{Coh}(C \times Pic(C), \mathcal{D}),$$

to D-modules on ${}^LBun$. But using the classical limit conjeture is had the equivalence through of the interpretation of Higgs sheaves, given in the category $D_{Coh}({}^LHiggs_0, \mathcal{O})$, which can be extended to the corresponding Langlands correspondence $\mathfrak{c}$, of the quantum sheaves given by $\mathfrak{c} = quant_{Bun} \circ \Phi \circ quant_C^{-1}$, where Φ, is the Fourier-Mukai transform that we want. Then we have as integral the integral transforms composition [2] $\mathfrak{c} \circ \Phi^{\mu} =^L \Phi^{\mu}$, which is solution to the field equation Isom$d\mathbf{h} = 0$, where $\mathbf{h}$, are the cotangent vector (Higgs fields).

Then by superposing of these states, considering the field corresponding ramifications(connections), we have

$$\mathcal{H} = \mathbf{H}^0(\omega_c) \oplus \mathbf{H}^0(\omega_C^{\otimes 2}) \oplus \cdots \oplus \mathbf{H}^0(\omega_C^{\otimes n}),$$

which has their re-interpretation as the curvature energy expressed through the H-states which can be written using the superposing principle to each connection $\omega_C^{\otimes j}$, (with C, a curve) that describes the corresponding dilaton (photon or gauge particle).

Likewise, in a Hamiltonian densities space [3] we have the Figure 1, considering a Hitchin base. In the case of a spinor representation the corresponding H-states can be given as spinor waves (Figure 2) which can be consigned in oscillations in the space-time-curvature/spin, to a microscopic deformation measured [4] in $\mathcal{H}$.

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[1] In a physical context (could be taken $\mathbb{M} = Pic(C)$, where $\mathbb{M}$, is the space-time), this represent a trace of particles in the symplectic geometry that can be characterized in a Hamiltonian manifold.

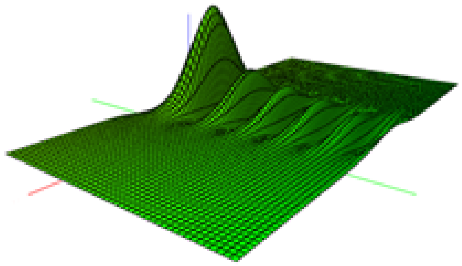

Figure 1

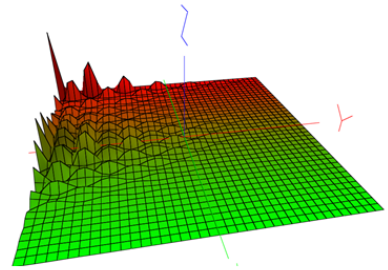

Figure 2

References

[1] *F. Bulnes* Extended d - Cohomology and Integral Transforms in Derived Geometry to QFT–equations Solutions using Langlands Correspondences

[2] *F. Bulnes* Integral Geometry Methods in the Geometrical Langlands Program, SCIRP, USA, 2016.

[3] *Francisco Bulnes (2017).* Detection and Measurement of Quantum Gravity by a Curvature Energy Sensor: H–States of Curvature Energy, Recent Studies in Perturbation Theory, Dr. Dimo Uzunov (Ed.), InTech, DOI: 10.5772/68026.

[4] *Bulnes, F. , Stropovsvky, Y. and Rabinovich, I. (2017)* Curvature Energy and Their Spectrum in the Spinor–Twistor Framework: Torsion as Indicium of Gravitational Waves. Journal of Modern Physics, 8, 1723–1736. doi: 10.4236/jmp.2017.810101.

Зміст