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Journal Name:	**Physical Science International Journal**
Manuscript Number:	**Ms_PSIJ_34248**
Title of the Manuscript:	**Hilbert scheme and multiplet matter content**
Type of the Article	

General guideline for Peer Review process:

This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty'**, provided the manuscript is scientifically robust and technically sound.
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PART 1: **Review Comments**

	Reviewer's comment	**Author's comment** *(if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)*
Compulsory REVISION comments	**What is claimed in the abstract and in the conclusion, i.e. the use of the Nakamura algorithm to compute the number of particle generations of instances of the standard model, i.e. the 1/3(1,1,1) and 1/3(1,2,10), was already done in a previous paper, co-authored by the same person who is writing this manuscript:** D-Branes and Hilbert Schemes https://core.ac.uk/download/pdf/2550008.pdf	**The publication in LANL e-print archive arXiv:hep-th/9811197 does not exclude the publication in the scientific journals, but is a positive fact for the article. The presented material consists of two models: 1/3(1,1,1) and 1/13(1,2,10). The first model was not presented anywhere, but the second was not published in any journal. As an example I presented the arXiv article arXiv:1612.08632 of Witten, which is published in Phys. Rev. Lett. 118, 158005 (2017).**
	The reviewer considers that the manuscript lacks scientific content, and it does not meet the requirement to be a sound review of known facts either, which are disconnected with the proposed purpose of the manuscript.	The proposed purpose of the manuscript is the studying of the properties of the D-branes through the properties of D-brane's base – orbifold and it was announced in the introduction. The parts EULER CHARACTERISTIC IN EUCLIDEAN GEOMETRY, PROJECTIVE GEOMETRY AND HILBERT SCHEME and COMPACTIFICATION OF HILBERT SCHEME are necessary for the ideological understanding of the final part of the manuscript BLOWING UP OF SINGULARITIES OF TORIC VARIETY, which is demonstrated on the specific models not

		previously considered: 1/3(1,1,1) and 1/13(1,2,10).
	That being said, Sections 5 and 7 are contained in Section 3 of the manuscript mentioned above, and the rest of the sections are very well known facts in geometry and topology for very particular cases, as explained in detail below.	Sections 5 and 7 are not contained in the Section 3 of LANL e-print archive arXiv:hep-th/9811197, because it was added new mathematical details. But the Nakamura's algorithm is universal and so it must be repeated in some main traits for new model 1/3(1,1,1).
	Section 2 gives a sketchy overview on the Euler characteristic in terms of the CW-decomposition of the Euclidean plane. It is not clear at all for the reviewer why the elliptical geometry needs to be mentioned, it is not relevant for the rest of the manuscript.	Section 2 contains the examples of coverage of the Euclidean plane by simplest figures and an example of Euler- Poincare characteristic calculation with the simplest polyhedra. This part is the historical and mathematical demonstration of the McKay quiver tessellated by tripods, which are in Nakamura's algorithm, used by us.
	Section 3 and 4 intend to give an outlook on the notion of orbifold, that can be found in any standard textbook on modern algebraic geometry,e.g Thurston's book "The Geomerty and Topology of 3-manifolds", Chapter 13.	The information of Thurston's book "The Geomerty and Topology of 3-manifolds", Chapter 13, contains more than 50 pages, but my purpose was to present the main information on 1-2 pages of Sections 3 and 4, that is necessary for the further calculations.
	Section 5 and 7 are almost identical to Section 3 of D-Branes and Hilbert Schemes **https://core.ac.uk/download/pdf/2550008.pdf**	Sections 5 and 7 are not contained in the Section 3 of LANL e-print archive arXiv:hep-th/9811197, because it was added new mathematical details. But the Nakamura's algorithm is universal and so it must be repeated in some main traits for new model 1/3(1,1,1). Moreover, the publication in LANL e-print archive arXiv:hep-th/9811197 does not exclude the publication in the scientific

	Section 6 is also standard knowledge in complex geometry and it does not connect with the rest of the manuscript. **In the conclusion is stated that "we can prove that the construction of the Hilbert scheme… is in accordance with Nakamura's algorithm". This was never proven.**	journals, but is a positive fact for the article. It is known different formulas for Euler-Poincare characteristic, but Section 6 is the demonstration of calculation of Euler- Poincare characteristic through the Hodge numbers as elements of Dolbeault cohomology group determined in the complex space. As we work in the complex space C, it was important to stress this fact for the physical understanding of the resulting calculations. We can prove that the construction of the Hilbert scheme in accordance with Nakamura's algorithm, which is identical to the blow-up of singularities of orbifold makes it possible to calculate topological invariant of manifold, which is associated with the number of particle generations in physics.
Minor REVISION comments	Line 68: These are not coverages of the Euclidean plane, these are just subregions. Line 70: Euler-Puankare-→ Euler-Poincare. Line 73: E is NOT the number of geodesic curves, it is the number of edges. For example, the diagonal of a square is a geodesic curve but is not an edge of the square. Line 130: Not ALL toric varieties are singular, e.g. the torus.	Line 68. Simplest figures for coverage of the Euclidean plane Line 70. Euler-Poincare Line 73. V - vertices of the polygon, E - the number of edges, F - the number of polygonal areas or faces. Line 130. Since the toric variety, studied in the paper, has singularities.
Optional/General comments		