XV Serbian mathematical congress, Belgrade, Serbia

Quantum "dots" and non-Euclidean crystallography on the 200th anniversary of János Bolyai's absolute geometry

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Abstract. My about 40 years old paper [1] in References had got a surprising actuality in the Chemistry Nobel Prize 2023 awards for the three Laureates: Alexey Ekimov, Luis E. Brus and Moungi G. Bawendi.

Of course, the present author of that paper could not guess that time the actuality and importance that was an incidental consequence of my erroneous paper [2], intended to construct an infinite series of non-orientable compact hyperbolic manifolds, as a polyhedral tiling series in the Bolyai-Lobachevsky hyperbolic space $\mathbf{H}^3$. Fortunately, I observed and improved the mistakes soon. Namely, those constructions were not manifolds because the two fixed point orbits as punctures, where points reflections (central inversions) occur in the symmetry group of the tricky polyhedral tilings.

But these singular points, as "quantum dots" e.g. for copper and chlorine ions, respectively, in glass (silicon) fluid cause light effects (by "electron jumping-leaping") whose colours might depend on the sizes of crystal particles. That means, the mistake was much more interesting than the original intention that can be reached easily later!

Keywords: non-orientable compact hyperbolic manifolds; polyhedral tiling series; "quantum dots".

References

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[2] **E. Molnár.** An infinite series of compact non-orientable 3-dimensional space forms of constant negative curvature. *Ann. Global Anal. Geom.*, 1983, 1(3), 37 - 49; Errata in 1984, 2(2), 253-254.