

XXXX.XXXXXXXXXXXXXXXXXXXXXXXXXX.XXX

Research

Article submitted to journal

Subject Areas:

quantum engineering/quantum physics

Keywords:

quantum correlations, local causality, Bell's theorem, spinors, quaternions, octonions

Author for correspondence:

Richard D. Gill

e-mail: gill@math.leidenuniv.nl

Comment on “Quantum correlations are weaved by the spinors of the Euclidean primitives”

R. D. Gill¹

¹Mathematical Institute, Leiden University, Netherlands

I point out some obviously fatal mathematical errors in the recent paper published in *Royal Society Open Science* “Quantum correlations are weaved by the spinors of the Euclidean primitives” by Joy Christian, director of the *Einstein Center for Local Realistic Physics*, which is located in the city of Oxford, in the UK.

Submitted to RSOS on the invitation of the editors. This is version 3; 29 October, 2020. Minor errors corrected and logos blanked .

1. The Hurwitz theorem, the core of Bell's theorem, and the Bell-core versions of Gull and of Gill

I will first summarise two well known and purely mathematical results, which contradict claims in Christian (2018) [3]. I will add to those two, another two more recent and less well known results. The two well established mathematical results are: (a), the so-called *Hurwitz theorem* (so-called because it was conjectured by Hurwitz; it was only proved decades later) showing that there are only only four normed division algebras \mathbb{R} , \mathbb{C} , \mathbb{H} and \mathbb{O} , see Baez (2002) [1]; (b) the mathematical core of *Bell's theorem*, Bell (1964) [2] on the incompatibility of quantum theory with local realism. The less well known results are (c) *Gull's theorem*, Gull (2016) [7], a computer science version of Bell's core result using well-known Fourier theory, and (d) *Gill's theorem*, Gill (2003) [5], an older and stronger version of Gull's theorem using well-known results from martingale theory.

