A physical interpretation of string theory?

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Abstract

This note identifies similarities between the cordus conjecture and string theory, and suggests opportunity for new research directions. To fully define a cordus particule requires 11 geometric independent-variables. This is the same number of dimensions predicted by some variants of string theory. There is also a similarity in the structural models, e.g. for the photon. The cordus model is physically descriptive and built with conceptual-design principles, whereas string theory provides a family of abstract mathematical models. Perhaps they are describing the same thing from different perspectives? Therefore we invite string theorists to consider whether the orthogonal spatial dimensions in their models could instead be interpreted as geometric independent-variables. Doing so would create new ways for interpreting string theories. Perhaps string theory might yet be a tool for the development of physically meaningful explanations for fundamental physics?

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String theory

What is the physical interpretation of string theory? That has been a problem for string theory from its outset. It lacks physical explanations for its predicted extra dimensions: 11 dimensions for M-theory, 10 for superstrings, 26 for bosonic strings, 5 for Randall–Sundrum models. Explaining them as curled-up dimensions ('compactified') that are too small to see is not an obviously credible answer. This lack of meaningful physical embodiment is one of the detriments of the theory. Furthermore there seems no way of knowing which of a multitude of sub-theories ('string vacua') is the right one. Nor does string theory provide testable predictions: it is apparently merely abstract models lacking any physical grounding.

Yet for all those deficiencies it does seem to offer the potential –though seemingly always beyond realisation- of integrating quantum mechanics and gravitation. For these reasons some physicists embrace string theory [1], while others reject it [2, 3].

Cordus conjecture

String theory seems particularly irrelevant if one seeks, as we do, for theory that provides a physically meaningful model and a logically consistent explanation for physics. Our own development, the cordus conjecture [4], offers a descriptive model that is coherent across multiple

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phenomena. It was built using a design method, as opposed to a mathematical approach, and the results are characteristically qualitative and descriptive. It has nothing in common with string theory. Indeed, it was primarily a dissatisfaction with the inability of string theory and quantum mechanics to provide descriptive explanations, that initiated the lateral-thinking effort that became the cordus conjecture. In searching for a different solution-path, we had considered string theory to be a failed epistemology, at least regarding the provision of physically meaningful concepts.

However our later work and some odd coincidences have caused us to question whether a deeper integration might exist.

We notice a curious coincidence in the number of hidden-variables [5] we propose for a cordus particule, see Figure 1, and the dimensions of some string theories. If one wishes to consider each cordus internal-variable a dimension, then the tally from cordus is three linear dimensions [x, y, z] for location of a reactive end, one for the length of the span (related to energy of the particule), two polarisation angles for the orientation of the HEDS (field emission directions) assuming that the [r] axis is always in the linear direction of the span (which we think is not the case with the photon, but then it only has one HED), one variable for each of three HEDs to denote the field activation status (hyffons) of that HED, one variable to indicate which reactive end is energising (spin), and one for the matter/antimatter hand. Not all these dimensions are ratio variables: some like the number and charge of hyffons are not simple numbers but sets, though this is not apparent in the case of the electron.

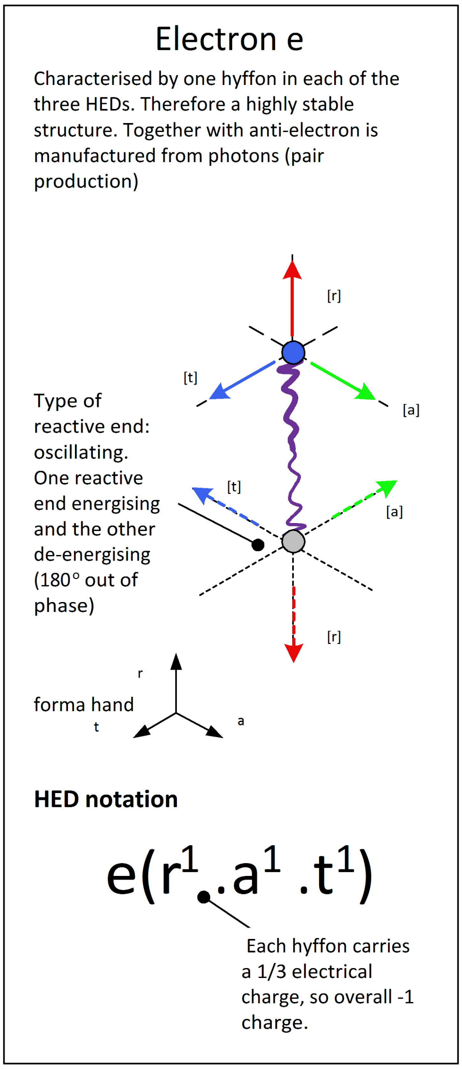

Figure 1: Cordus model for an electron particule. Every cordus particule has two reactive ends a short geometric distance apart (span). These ends are energised in turn, with the one de-energising as the other energises. In this figure the upper is energising. At energisation the reactive end draws hyffon pulses outwards or inwards (a sign convention for negative and positive charge respectively) down three orthogonal axes, [r], [a] & [t]. These hyffon are quantised, and the number and arrangement thereof determine the nature of the particule. Multiple hyffon pulses may be present in any one HED, but for stability the net total must be three or zero: each hyffon pulse carries a 1/3 charge, and the sign is determined by the direction. The HED notation is a symbolic representation of the HED arrangements for this particule.

Common ground

Depending on how they are counted, that gives a total of 11 independent geometric variables to fully define a cordus particule. Strangely, that is the same number of dimensions predicted by some variants of string theory.

There is also a similarity in the structural models. String theory predicts that the photon is an open string, and cordus also predicts a photon particule with two free ends. Likewise string theory predicts that bosonic matter consists of closed strings, and cordus has a complementary concept of closed nuclear polymers.

Possible opportunities

The cordus model is physically descriptive and built with conceptual-design principles, whereas string theory provides a family of abstract mathematical models. Perhaps they are describing the same thing from different perspectives?

Separately we have shown that it is possible to integrate quantum mechanics (QM) with the cordus model. Thus we have suggested that the probabilistic mathematics of quantum mechanics may be a high-level approximate representation of a deeper determinism, more adequately represented by cordus-type models. More specifically, we propose that the frequency oscillations of the cordus particule, i.e. the opposed energisation and de-energisation of the reactive ends, are represented in their averages by the QM concepts of wave function and superposition.[2] So an integration between cordus and QM looks to be conceptually feasible.

A wider, three-way integration might be possible. Might the quantitative model of QM, the conceptual model of the cordus conjecture, and the dimensional model of string theory, all be related?

It depends?

It depends on how flexible one wishes to be when interpreting the term 'dimension'. String theory treats its additional dimensions as orthogonal spatial axes. That is not too far from what the cordus model offers, with its independent geometric variables, but also not identical.

If it might be valid to interpret string dimensions as geometric variables, then the next question is whether a cordus-type design could be accommodated within a variant of string theory. The null hypothesis is of course that the observed similarities are spurious.

However if an accommodation could be achieved, then it would be interesting to see if the mathematical insights of string theory could be focused to provide a theoretical foundation for a cordus mechanics. For example, the cordus conjecture already includes a conceptual integration

[2] The cordus model accepts the QM machinery, including the quantitative model that is the wave-function, but contests the QM qualitative constructs of zero-dimensional points, and superposition.

of the electro-magnetic-gravitational forces and the strong force, and it could be interesting to see whether this was amenable to a quantitative formulism within a string theory. In return, the potential benefits to string theory could be the provision of a physical representation, hence greater relevance. Having a physical model might help string theory overcome its current limitations of being a set of abstract theories lacking specificity.

Perhaps string theory might yet be a tool for the development of physically meaningful explanations for fundamental physics?

Therefore we invite string theorists to consider whether the spatial dimensions in their models could instead be interpreted as geometric independent-variables. That might not be a popular move, because it could imply the existence of hidden-variables, and physics is generally against that interpretation. Nonetheless it may be an assumption worth questioning, especially as hidden-variable solutions have still not been ruled out [6, 7].

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