

Nothing Was Invented; Something Was Found — and What Was Found Was a Circle and a Clock

Where the complex numbers of physics come from. Above: the two real sources at the top of the page — one compact, non-spatial phase circle and one causal clock with energy positivity — and the single complex structure they force, read at three levels of symmetry. With one clock it is Hardy-space holomorphy and the imaginary unit is the Hilbert transform, a real integral operator. Demanding agreement among all inertial clocks enlarges it to the forward tube. Demanding it under the full conformal group completes it to twistor space. Below: that top level drawn — projective twistor space cut in two by the sign of the helicity form, so the split between positive and negative frequency becomes the geography of a complex three-space. Two of the bridge's three levels are the twistor school's own theorems, credited as such; what is claimed here is the direction of explanation, and only that. In full: Figure 4, p. 43, and Figure 3, p. 42.

