Einstein's reply to Bell and others? A simple constructive classical foundation for quantum theory

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Abstract Having elsewhere refuted Bell's theorem irrefutably with elementary mathematics, we here advance Einstein's ideas similarly with a classical Lorentz-invariant theory, observationally-indistinguishable from quantum mechanics. Given that our elementary theory is straight-forward and non-mysterious, we provide an Einsteinian—a specifically local and truly realistic—advance toward understanding the classical nature of physical reality at the quantum level. We thus resolve Bell's dilemma in Einstein's favor: as Bell half-expected, he and his supporters were being rather silly.

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0. Introducing Bell's dilemma and true local realism (TLR)

> 0.0. 'That's the dilemma. ... I step back from asserting that there is action at a distance (AAD), I say only that you cannot get away with locality. You cannot explain things by events in their neighbourhood; but I'm careful not to assert AAD,' after Bell (1990:7,13).[2]

0.1. In reply, and to the contrary:[3] (i) We correct Bell's errors (and thus resolve his dilemma) via *true local realism* (TLR), the union of true locality and true realism. (ii) *True locality* insists that no influence propagates superluminally, after Einstein. (iii) *True realism* insists that some beables may change interactively, after Bohr: *naive-realism* is then, for us, any brand of *realism* that negates or neglects *that* 'may' when relevant. (iv) Under TLR we then show that Einstein's program succeeds: you can get away with no AAD; you can explain things by events in their neighbourhood; you can refute Bell's theorem—ie, the union of false inequalities [say, Z] with concomitant false claims [given Z]—based, as it is, on naive-realism. (v) By way of example, we refute ubiquitous claims like these:

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[2] A clue: "The lesson to be learned [from QM] is that probable refinements of mathematical methods will not suffice to produce a satisfactory theory, but that somewhere in our doctrine is hidden a concept, unjustified by experience, which we must eliminate to open up the road," Born (1954:266). Our finding: The hidden-concept is naive-realism; it hides in plain sight here — Bellian realism, Bell's theorem, Bell's dilemma, local realism, locally realistic, realism.

[3] Reading Mermin (1988) [akin to his 1985], TLR began thus: (i) Only the impossible is impossible. (ii) Reality makes sense and we can understand it. (iii) Similar/correlated tests on similar/correlated things produce similar/correlated results without mystery. (iv) A cosine-squared law like Malus' works here. (v) There is no spooky action at a distance. (vi) Bell's theorem and Mermin are wrong. (vii) In the given context, pristine particles carry law-like instruction sets.

(vi) 'Einstein maintained that quantum metaphysics entails spooky actions at a distance; experiments show that what bothered Einstein is not a debatable point but the observed behaviour of the real world,' after Mermin (1985:38). (vii) 'Our world is non-local,' after Davies (1984:48), Goldstein *et al.* (2011:1), Maudlin (2014:25), Bricmont (2016:112). (viii) '... the predictions of quantum theory cannot be accounted for by any local theory,' after Brunner *et al.* (2014:1), Norsen (2015:1). [Noting the certainty of these claims, let's see.]

1. Toward resolving Bell's dilemma via TLR

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