Getting rid of nonlocality from quantum physics through Bohr's complementarity

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This talk is aimed to dissociate nonlocality from quantum theory [1]. We demonstrate that the tests on violation of the Bell type inequalities are simply statistical tests of local incompatibility of observables. In fact, these are tests on violation of the Bohr complementarity principle. Thus, the attempts to couple experimental violations of the Bell type inequalities with "quantum nonlocality" is really misleading. These violations are explained in the quantum theory as exhibitions of incompatibility of observables for a single quantum system, e.g., the spin projections for a single electron or the polarization projections for a single photon. Of course, one can go beyond quantum theory with the hidden variables models (as was suggested by Bell) and then discuss their possible nonlocal features. However, conventional quantum theory is local.

[1] A. Khrennikov, Entropy 21 (2019) 806.