Leggett-Garg Inequalities, Pilot Waves, and Contextuality

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In this talk I first analyse Leggett and Garg’s argument to the effect that macroscopic realism contradicts quantum mechanics. After making explicit all the assumptions in Leggett and Garg’s reasoning, I argue against the plausibility of their auxiliary assumption of non-invasive measurability, using Bell’s construction of stochastic pilot-wave theories as a counterexample. Violations of the Leggett–Garg inequality thus do not provide a good argument against macrorealism. I then apply Dzhafarov and Kujala’s analysis of contextuality in the presence of signalling to the case of the Leggett–Garg inequalities, with rather surprising results. An analogy with pilot-wave theory again helps to clarify the situation.