

**2.12.2020 Experimental Realization of Einstein-Podolsky-Rosen-Bohm Gedankenexperiment: A New Violation of Bell's Inequalities**  
by Alain Aspect, Philippe Grangier, and Gérard Roger  
[Phys. Rev. Lett. 39, 691 \(1977\)](#)

**Questions/Tasks/Stimulations:**

- Bibliometrics: What do you know about the authors and impact of the paper?
- In which sense the paper is a milestone?
- Describe/Explain the EPR Gedankenexperiment and its consequences. For this purpose, discuss the Bell Inequalities and the term “hidden variables” and “local realistic theories”. What is a loophole free Bell test?
- Explain the difference of classical and quantum correlations. Maybe *Dr. Bertlmann* can help you.
- Which other EPR experiments were performed before Aspect's paper and what have been their shortcomings?
- Sketch the experimental Setup used by A. Aspect et al. and explain its components including the used EPR source (energy level scheme?) and its operation principle. What are differences compared to the original EPR Gedankenexperiment?
- Summarize the execution and the results of the experiment.
- Which loopholes (cf. task 3) need to be closed to unambiguously reject local realistic theories and which of them are not accounted for in Aspect's experiment? Did other experiments close these loopholes?
- Which setup/technology would you use today to demonstrate the EPR Experiment? Provide a sketch.
- Are commercial products available for EPR experiments? If yes, please report their idea/concept/working principle and price .