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# Seminar über Quanten-, Atom- und Neutronenphysik (QUANTUM)

June 25, 2020 at 2 p.m. c.t.  
<https://zoom.us/j/94520261050> (Passwort-Anfrage an "stuckker@uni-mainz.de")

Prof. Dr. Jakob Reichel  
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## **Long-lived spin squeezing and quantum phase magnification in a trapped-atom clock with fiber Fabry-Perot cavity**

Many if not all future quantum technologies are enabled by quantum correlations in a well-controlled many-particle system. In ensembles of atoms, ions and many other quantum emitters, such correlations can be generated with a high-finesse optical cavity. This approach is particularly promising for quantum metrology. I will present an experiment combining a compact trapped-atom clock on an atom chip and a fiber Fabry-Perot microcavity. This first "metrology-grade" spin squeezing experiment enabled us to produce spin squeezed states with unprecedented lifetime up to a second, and to observe a "quantum phase magnification" effect due to the subtle interplay of these many-particle entangled states with the exchange interaction that occurs in the trapped low-temperature gas.

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