

# On-line SPICE-SPIN+X Seminars



**Wednesday, 7th April 2021, 15:00 (German Time)**

The seminar will be via Zoom ([Meeting ID: 851 3184 0544](#)) and live streamed in the SPICE YouTube Channel.

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## **Quantum magnonics: Quantum optics with magnons**



In the last five years, a new field has emerged at the intersection between Condensed Matter and Quantum Optics, denominated “Quantum Magnonics”. This field strives to control the elementary excitations of magnetic materials, denominated magnons, to the level of the single quanta, and to interface them coherently to other elementary excitations such as photons or phonons. The recent developments in this field, with proof of concept experiments such as a single-magnon detector, have opened the door for hybrid quantum systems based on magnetic materials. This can allow us to explore magnetism in new ways and regimes, has the potential of unraveling quantum phenomena at unprecedented scales, and could lead to breakthroughs for quantum technologies. A predominant role in these developments is played by cavity magnonic systems, where an electromagnetic cavity, either in the optical or microwave regime, is used to enhance and control the interaction between photons and magnons. In this talk, I will introduce the field and present some theoretical results from our group which aim to push the boundaries of the current state of the art.