Quantum Simulation of Spin Models in Arrays of Rydberg Atoms

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In this talk, I will show how programmable arrays of single Rydberg atoms can be used for the quantum simulation of spin Hamiltonians with up to 200 individually controlled spins. After a brief introduction to the experimental techniques we use, I will report on the simulation of Ising [1] and XXY [2] spin models, and on first steps to scale up the atom numbers in our platform by using a cryogenic environment [3].

References:
[1] P. Scholl *et al.*, Nature **595**, 233 (2021).
[2] P. Scholl *et al.*, arXiv:2107.14459.
[3] K.N. Schymik *et al.,* Phys. Rev. Applied **16,** 034013 (2021).