

# ExtreMe Matter Institute EMMI

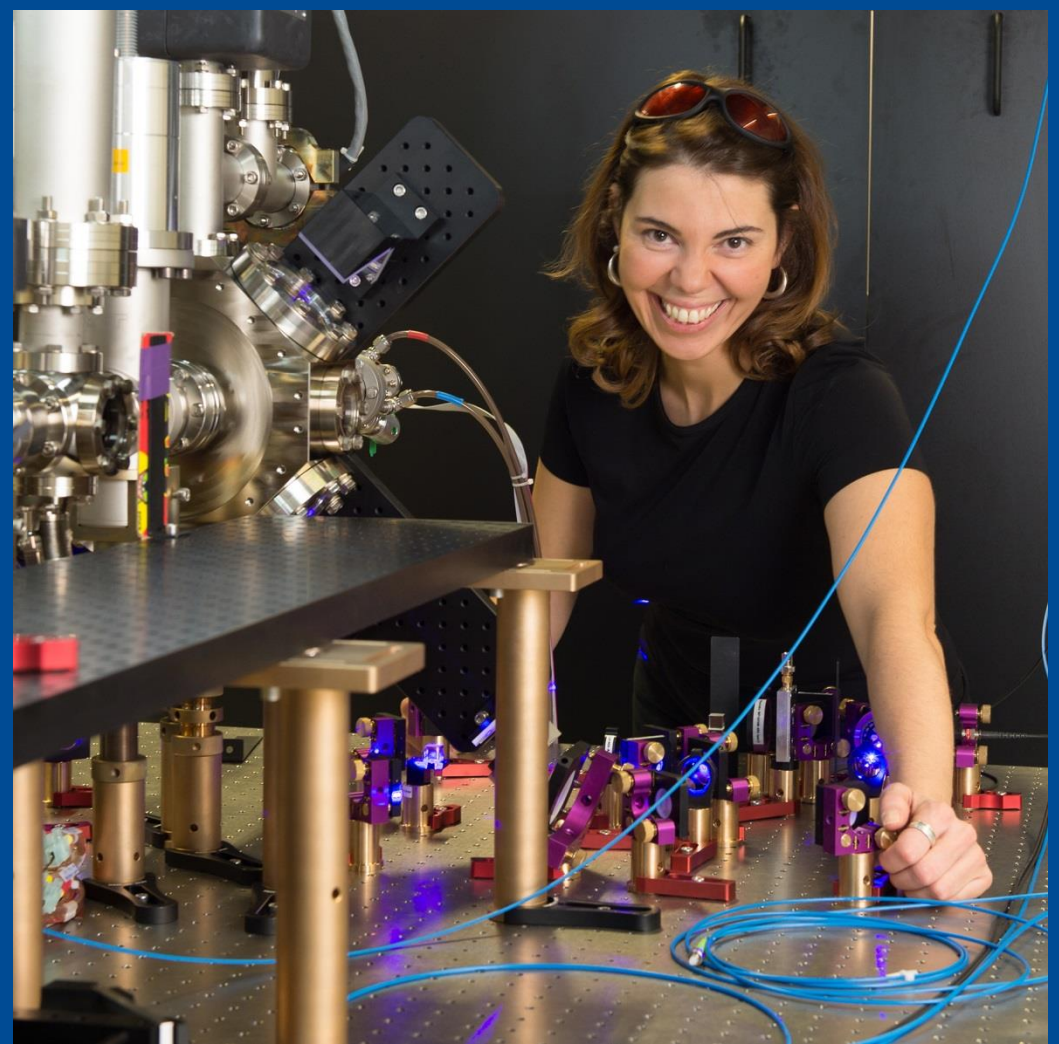
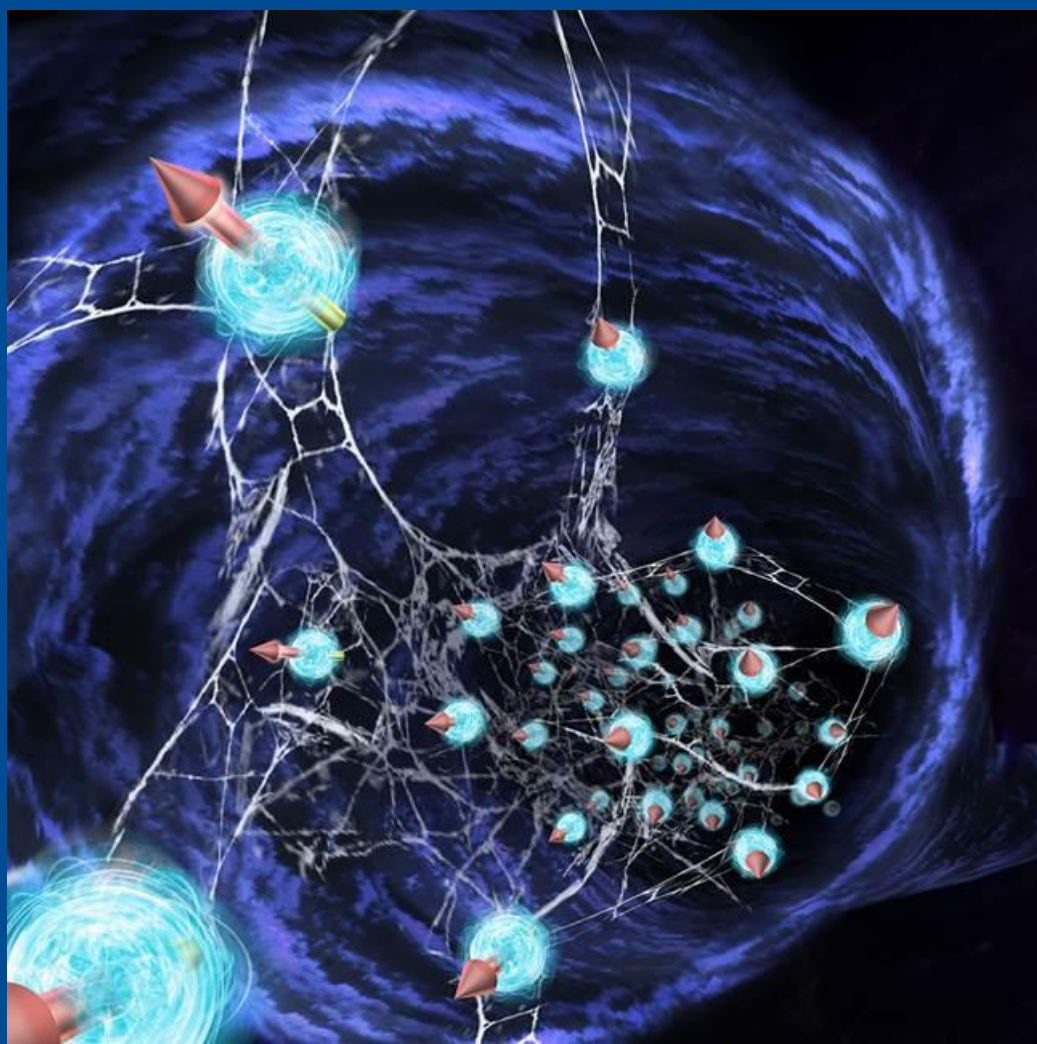
EMMI Featured Talk / GSI Colloquium

## From rotons to quantum droplets: Dipolar quantum gases echo He superfluid phenomena

Francesca Ferlaino

Institut für Experimentalphysik, Universität Innsbruck, Innsbruck, Austria and  
Institute for Quantum Optics and Quantum Information (IQOQI), Innsbruck

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With the tremendous advances in cooling and manipulation techniques, ultracold atomic gases have consolidated themselves as an ideal system to address fundamental questions in quantum few- and many-body physics. Recently, we have reached Bose-Einstein condensation and Fermi degeneracy with ultracold Erbium atoms. This “exotic” atomic species combines unusually rich atomic spectra and a large magnetic moment.

In the quantum regime, bosonic Er atoms feature interactions of genuinely different nature. The more ordinary and magnetically-tunable contact interaction combines with the long-range and anisotropic magnetic dipolar interaction. The mere existence and competition between these two sources of interactions dictate the physics at play, disclosing a variety of intriguing phenomena in close connection to superfluid He.

This talk will provide an overview of some fascinating dipolar phenomena from the Innsbruck perspective, including the first observation of rotons in the gas and quasi-self-bound quantum droplets.