Quantum Nanophysics, Optics and Information

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What do we do?

we are a ***theory*** group:

- pen & paper calculations
- thinking
- numerical simulations
- read/write/discuss

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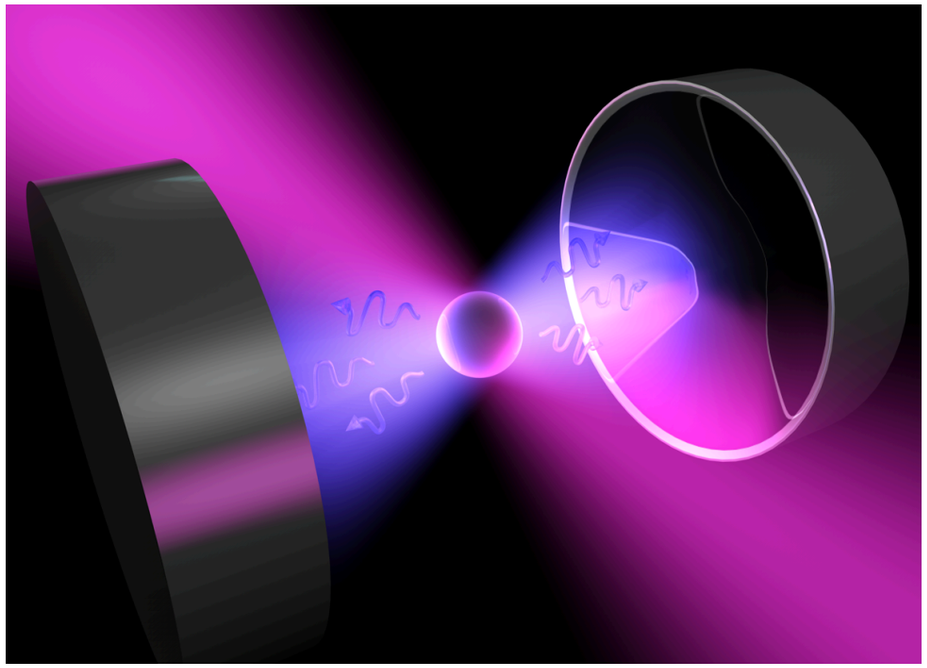
Core topic:

levitated nanoparticles

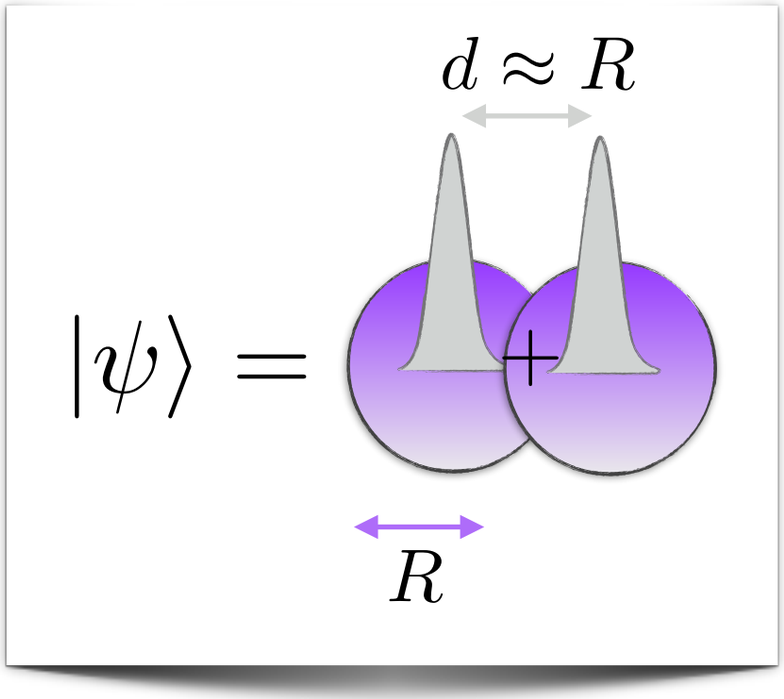


- small size (nanometers) but consist of billions of atoms
- very well isolated from the environment = **very suitable to study quantum phenomena**

What is our long-time goal?

Create macroscopic quantum superpositions…

…do the theory proposal for this



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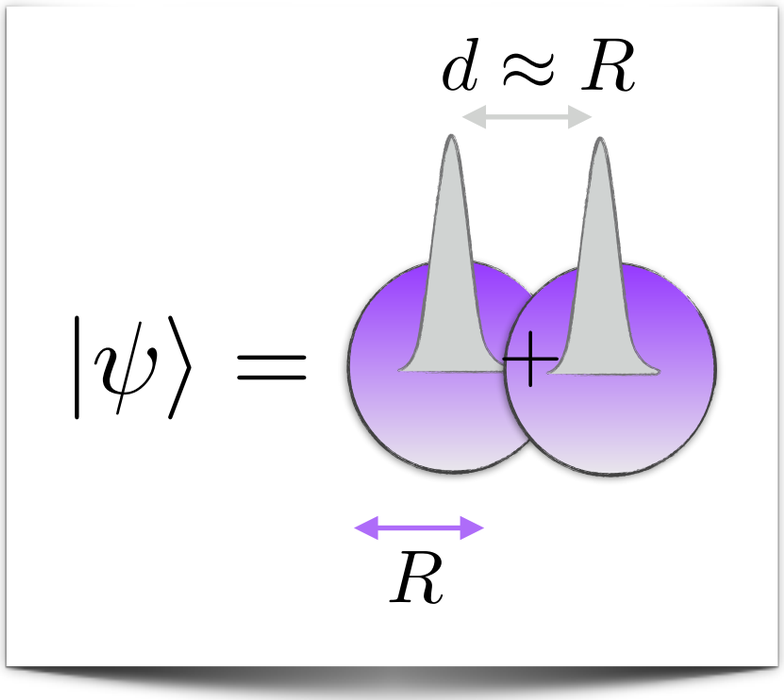
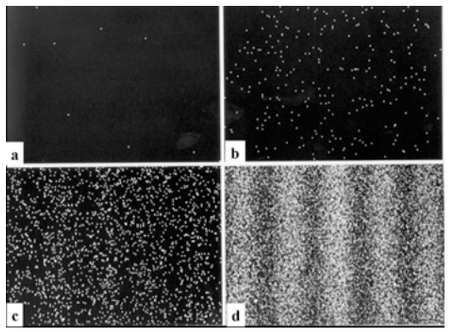
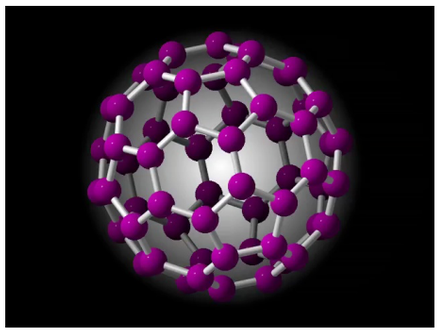
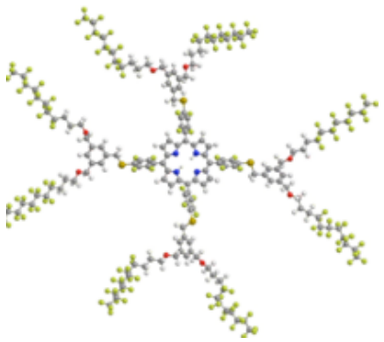




electrons and neutrons
30's



fullerene molecules
1999



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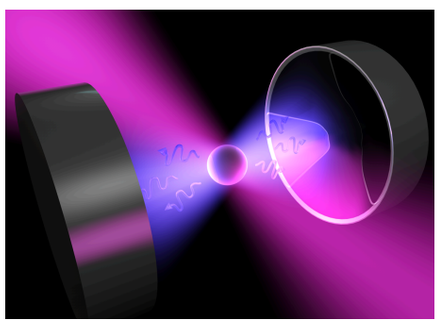

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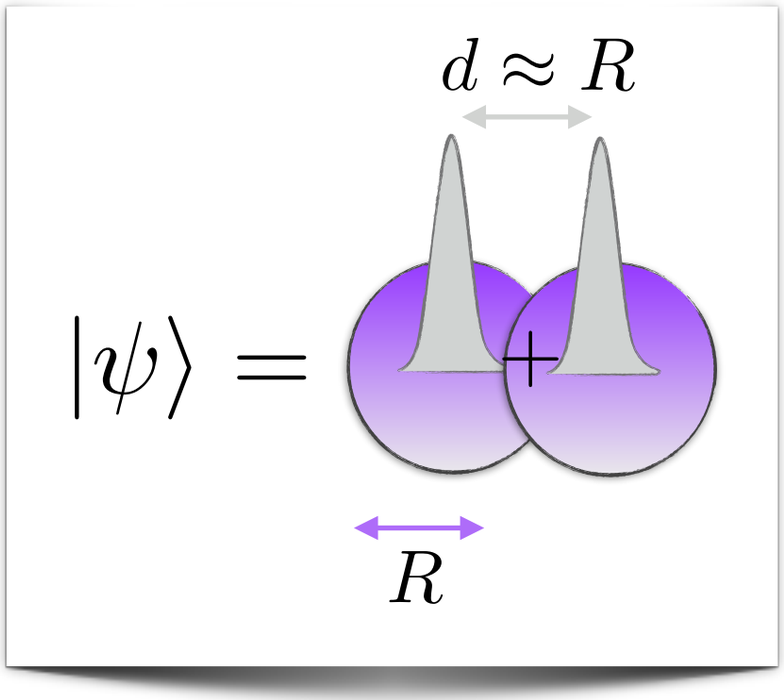

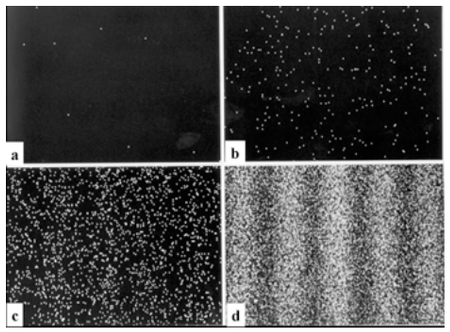

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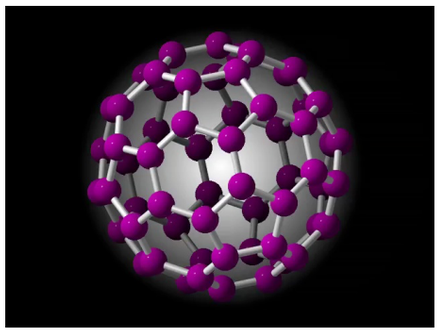

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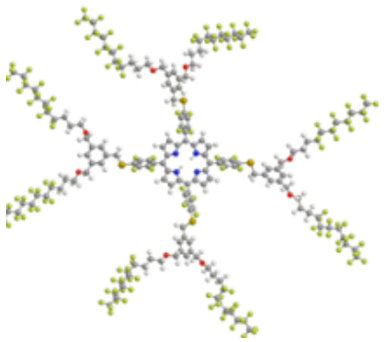

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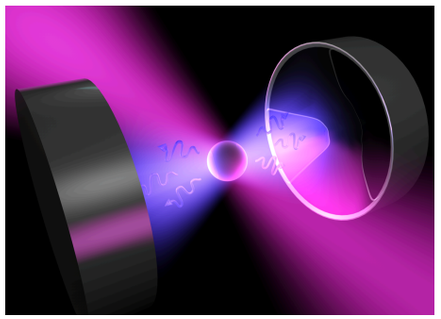

levitated nanoparticles
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understand and test fundamental quantum mechanics in yet unexplored regimes

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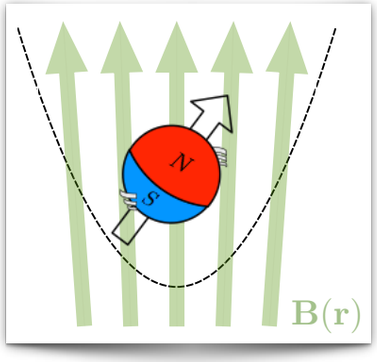
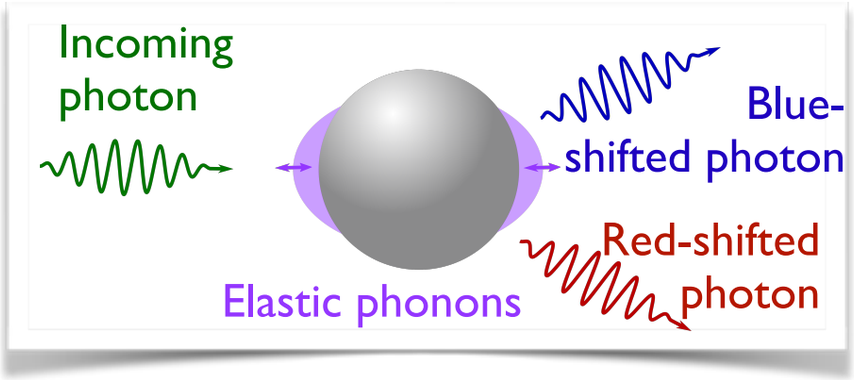
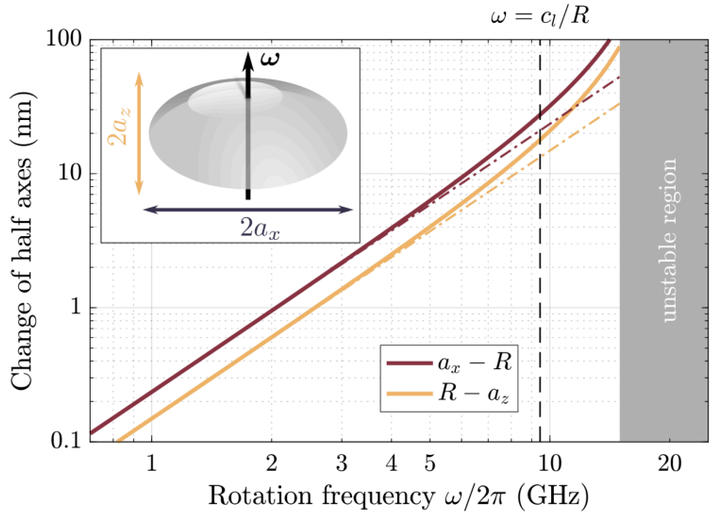
Create macroscopic superposition states

What is needed?

- *understand* and *mathematically describe* all degrees of freedom (internal and external) of levitated nanoparticles as well as the sources of decoherence







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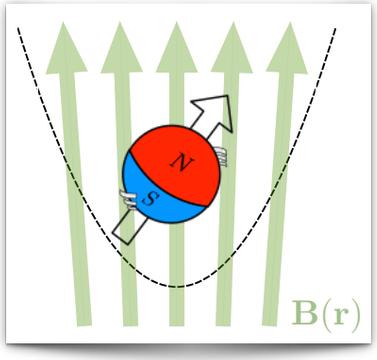
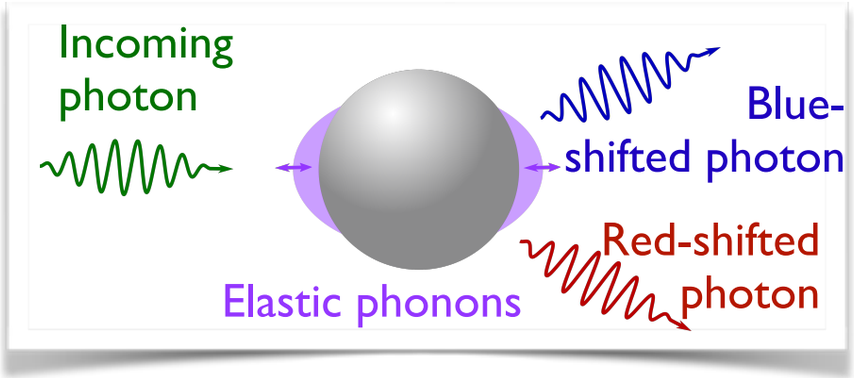
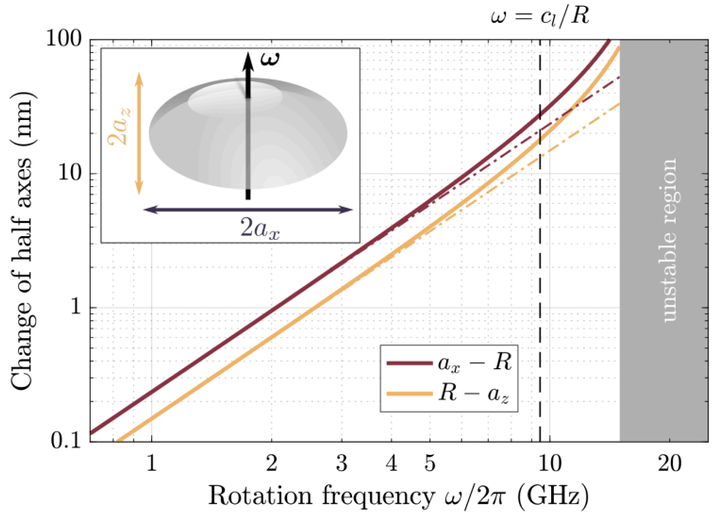
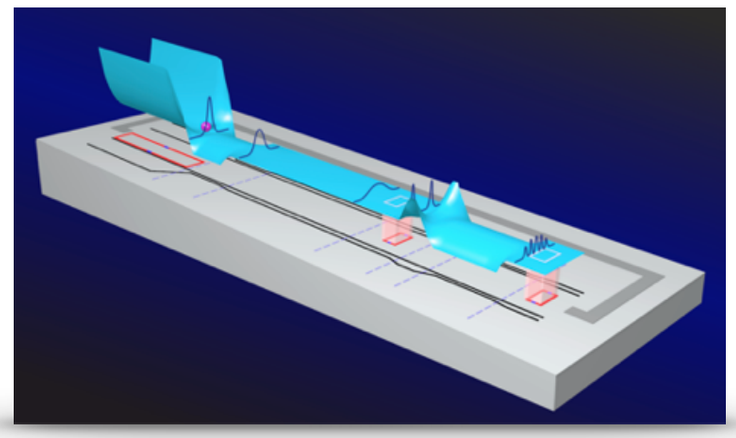
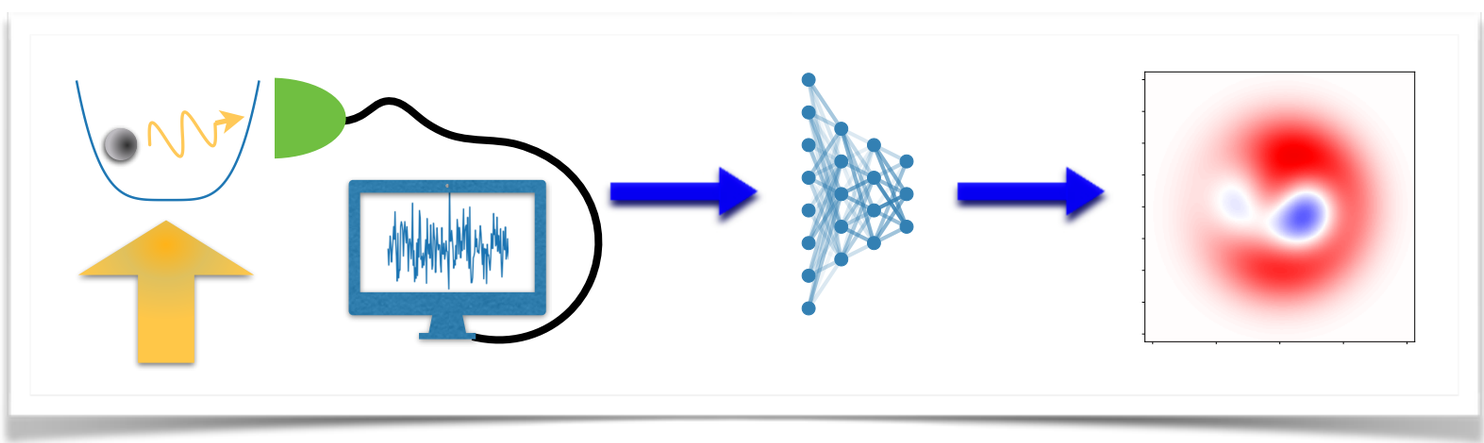






- propose ways to *prepare*, *control*, and *measure* the particles





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You can find potential topics on the website or just write an email and ask!