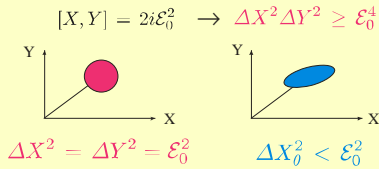
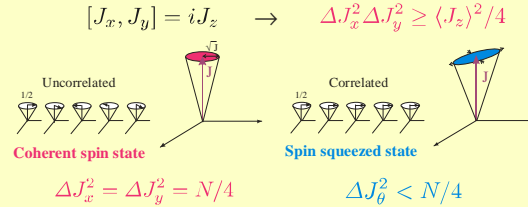


**Abstract :** we present the experimental setup we are building to store quantum properties of light into an ensemble of cold Cs atoms. We intend to transfer the field squeezing to the collective angular momentum of the atoms. The experiment is naturally divided into two parts : the atom trap, and the source of non-classical light.

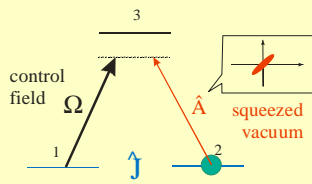
### Field squeezing



### Atomic squeezing



### Atoms ⇄ field transfer



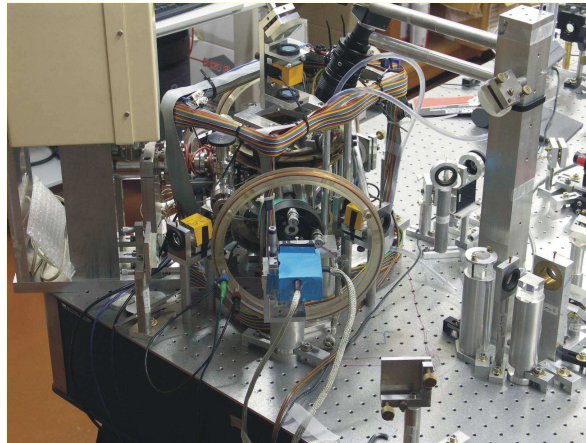
**Related publications :**  
 - A. Dantan *et al.* Phys. Rev. A **69**, 043811 (2004)  
 - A. Dantan *et al.* Phys. Rev. A **71**, 043801 (2005)

#### Conditions :

- Coherence resonantly excited (2-photon resonance)
- low losses ⇄ E.I.T or ⇄ Raman

#### Expected performances :

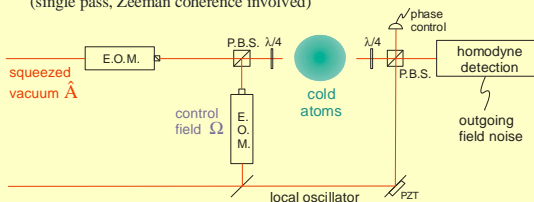
- Transfer efficiency  $\eta = \frac{\text{atomic squeezing}}{\text{field squeezing}} > 90\%$
- Storage time > ms limited by the relaxation of the ground states coherence
- Reading/writing time for optimized efficiency ~  $\mu\text{s}$



*The magneto optical trap*

### The quantum memory experiment (project)

One possible realization (single pass, Zeeman coherence involved)



#### Conclusion :

Very encouraging perspectives

- Atom trap and doubling cavity already working
- Several possible configurations to be explored :
  - Cavity/single pass
  - E.I.T./Raman
  - Zeeman/hyperfine coherence

the experiment sequence

