

偏極ヘリウムの電子過程と表面スピン

山内 泰

原子ビームグループ 量子ビームセンター



Outline

- Introduction

 - history, electronic processes

- How to produce spin-polarized (2^3S)He beams

 - optical pumping, magnetic deflection

- Spin-dependent phenomena

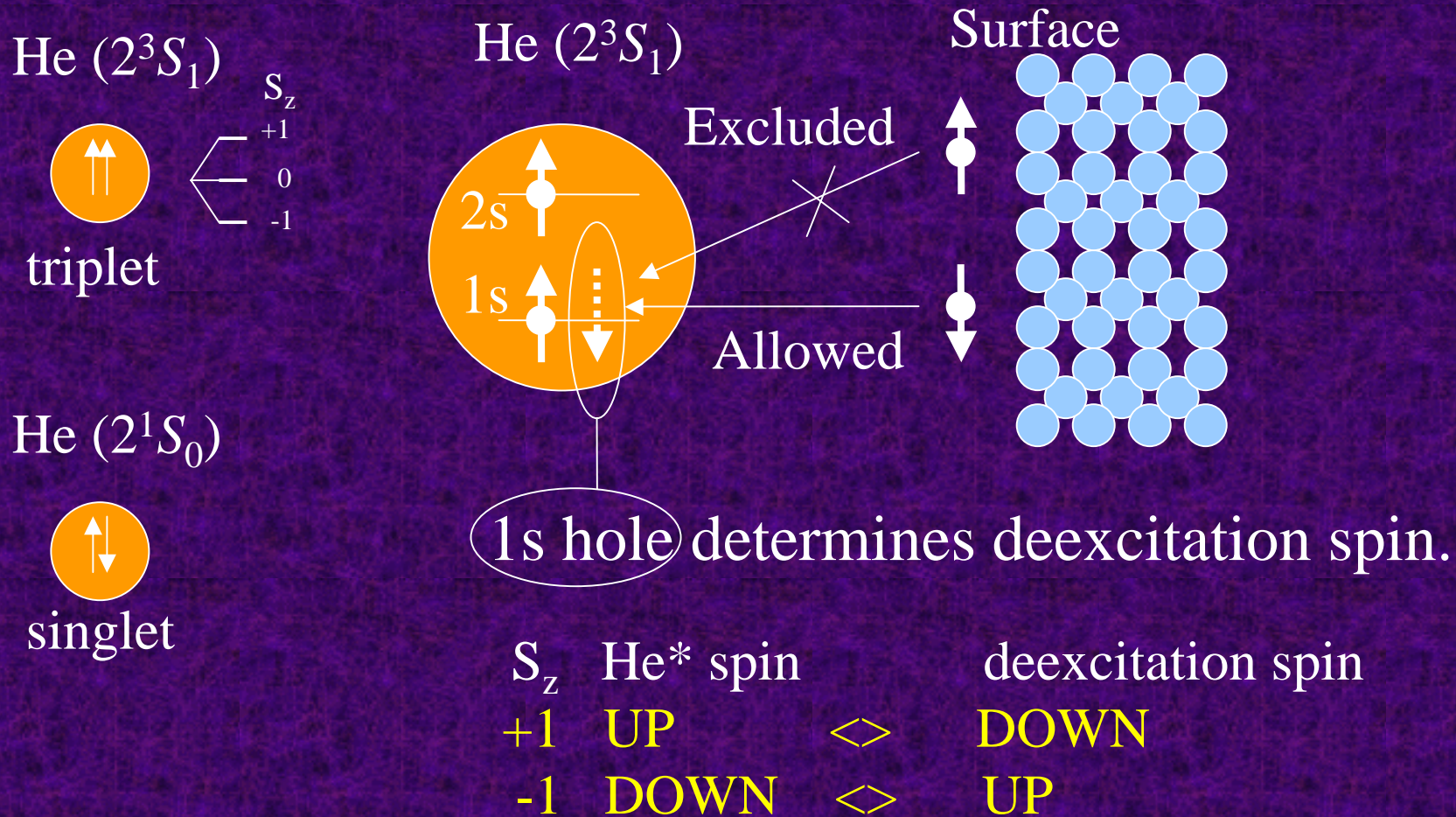
 - electron ejection, desorption, atom scattering

- Induced spin polarization of surface adsorbates

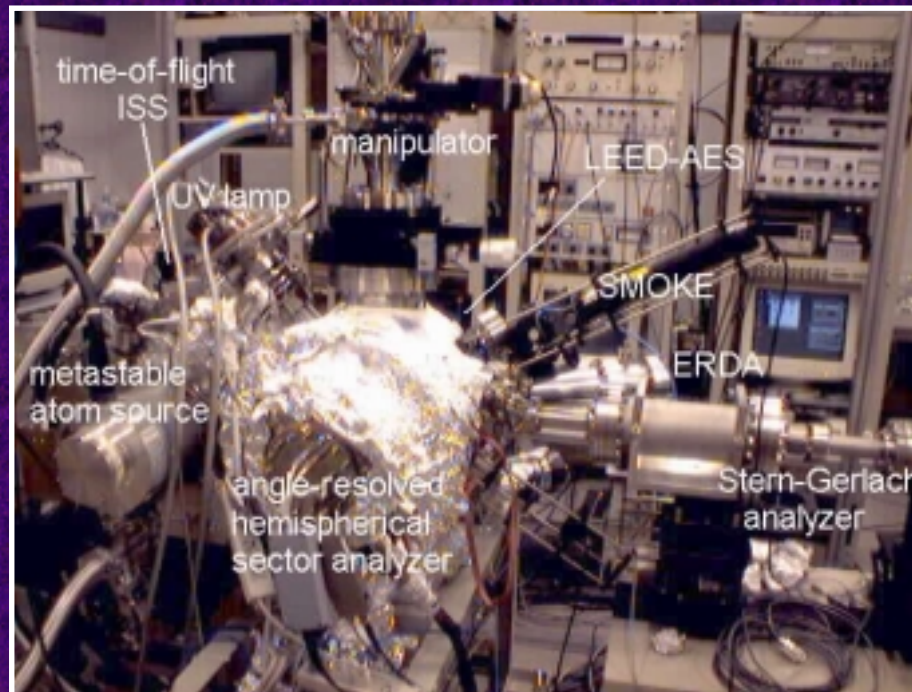
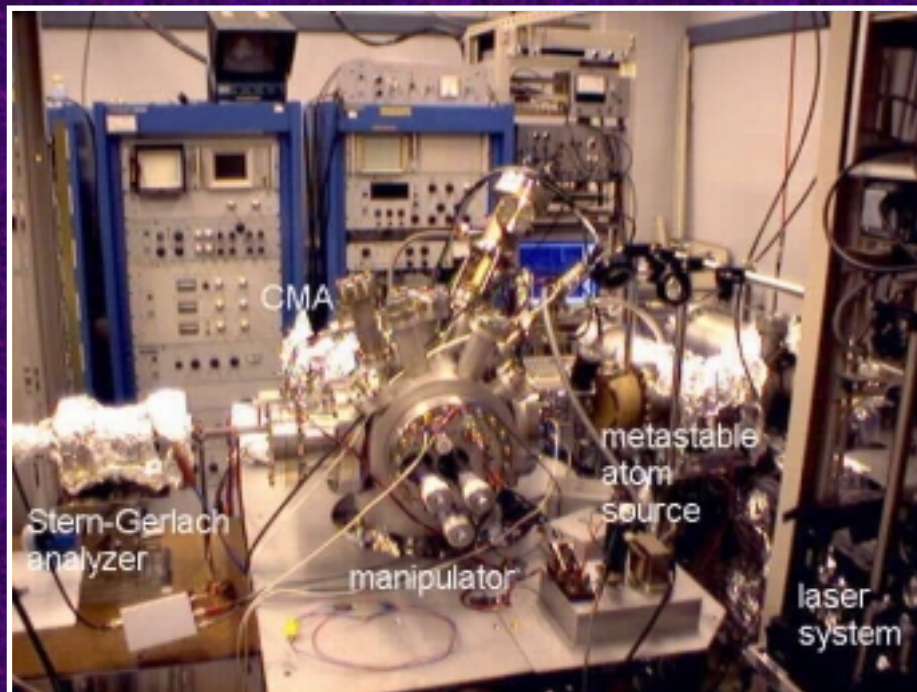
- Summary and prospects (ion, molecule)

Spin dependent deexcitation

The degeneracy of He* should be removed under a defining **magnetic field**.



Snapshots of apparatuses



Summary and prospects

- Spin-dependence in electron ejection, desorption and scattering
- Surface electron spin detection by He(2^3S_1)

- Applications

Surface magnetism (3d, 4f), Non-collinear magnetism, AFM,

Organic molecule/FM, Semiconductor/FM, Insulator/FM

- Developments

Lateral resolution (EEM) --- Intensity

Hysteresis loop --- High magnetic field

Element-specific spin state (SPISS) --- He* >>> Spin-polarized He⁺

Spin-dependent reaction --- Spin-rotationally state-selected O₂