Eight lecture

Magneto optic devices

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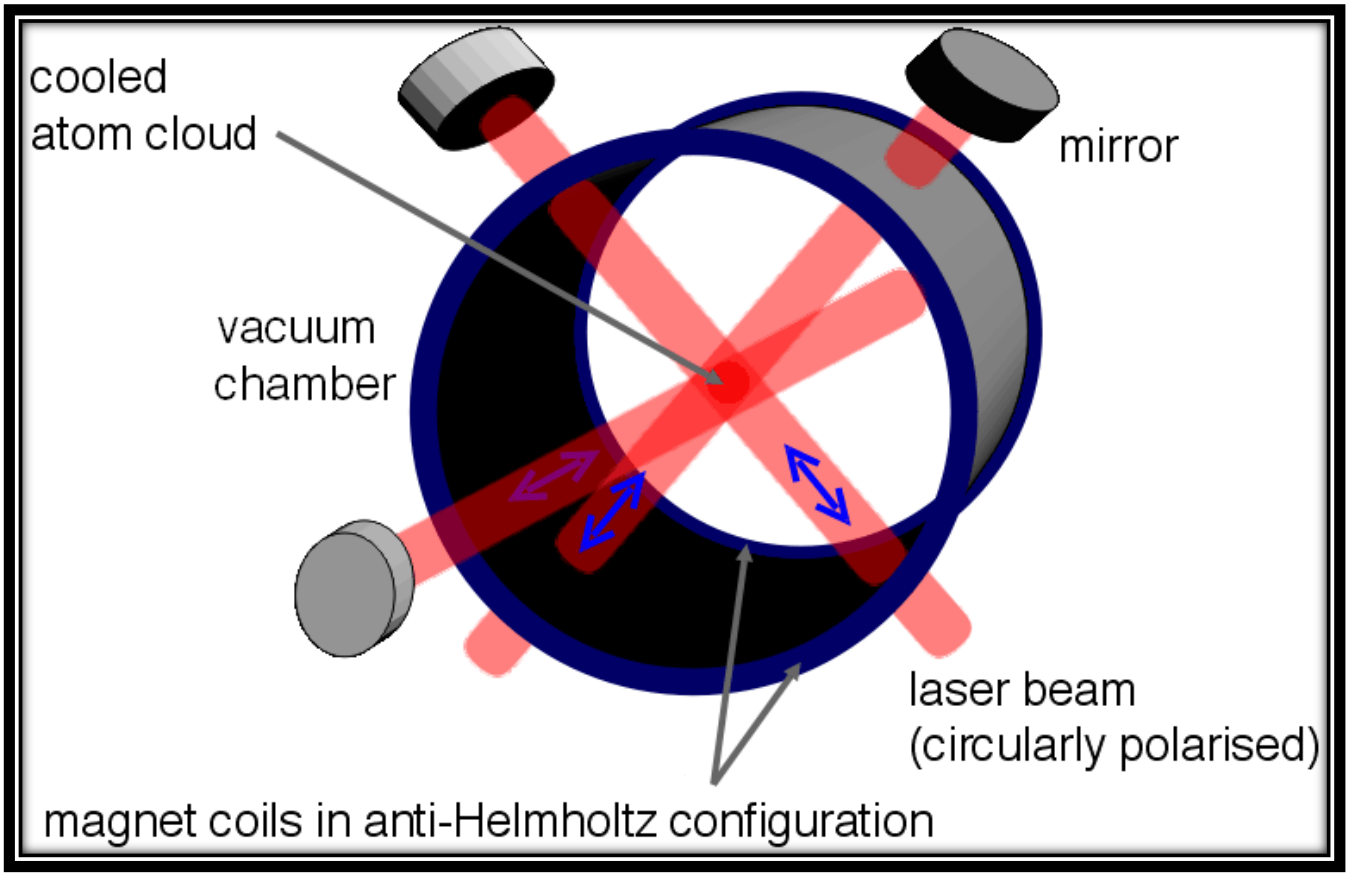
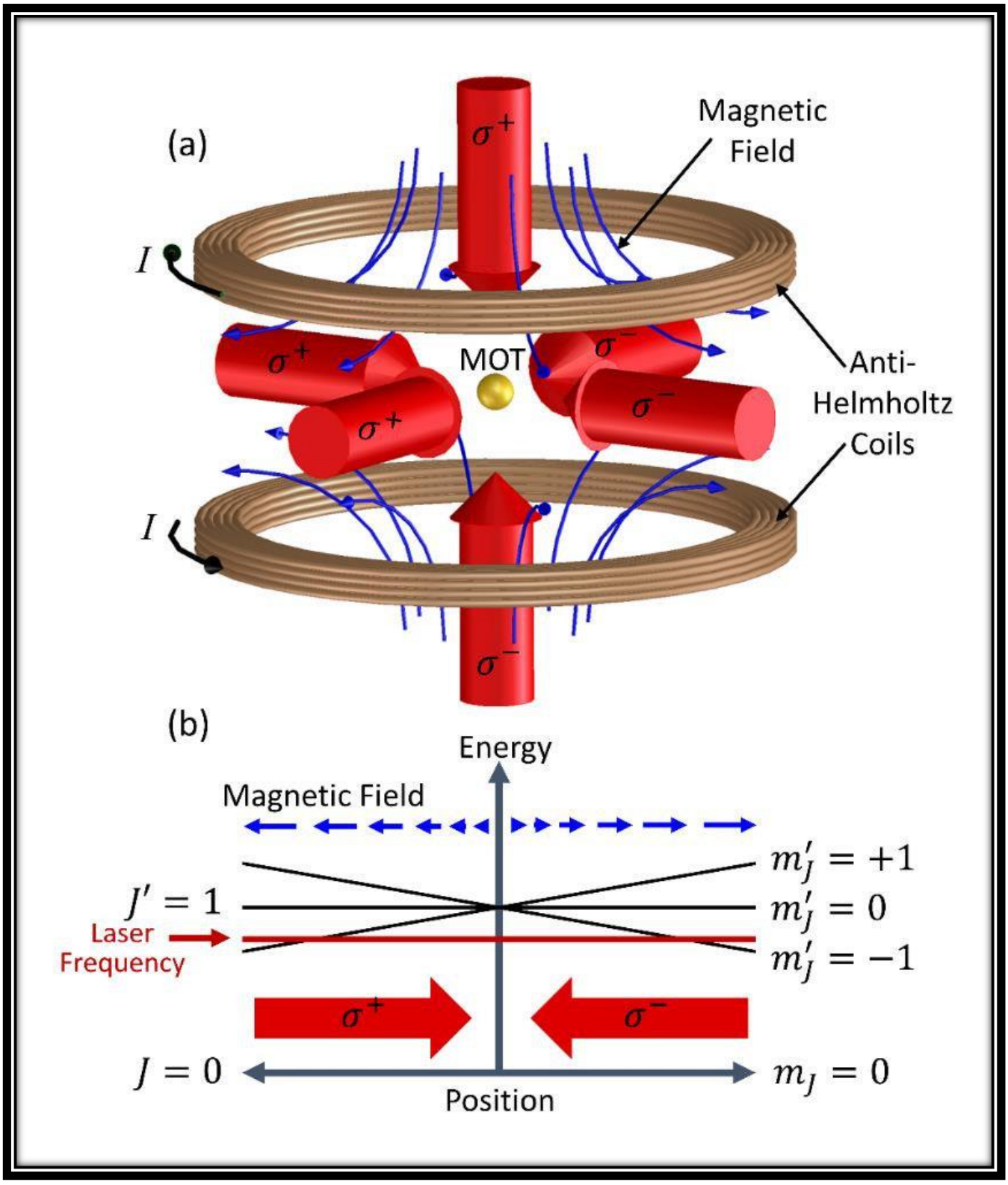
Magneto optic devices

Magneto-optics (MO) is an effervescent research field, with a wide range of potential industrial applications including sensing, theranostics, pharmaceutics, magnetometry, and spectroscopy, among others. This review discusses the historical development, from the discovery of MO effects up to the most recent application trends. In addition to the consolidated fields of magnetoplasmonic sensing and modulation of optical signals, we describe novel MO materials, phenomena, and applications. We also identified the emerging field of all-dielectric magnetophotonics, which hold promise to overcome dissipation from metallic inclusions in plasmonic nanostructures. Moreover, we identified some challenges, such as the need to merge magneto-chiroptical effects with microfluidics technology, for chiral sensing and enantioseparation of drugs in the pharmaceutical industry. Other potential industrial applications are discussed in light of recent research achievements in the available literature.


cooled
atom cloud
mirror
vacuum
chamber
laser beam
(circularly polarised)
magnet coils in anti-Helmholtz configuration


(a)
Magnetic Field
σ^+
I
σ^+
MOT
σ^-
σ^+
σ^-
Anti-Helmholtz Coils
I
σ^-
(b)
Energy
Magnetic Field
$m'_J = +1$
$J' = 1$
$m'_J = 0$
Laser Frequency
$m'_J = -1$
σ^+
σ^-
$J = 0$
$m_J = 0$
Position