

1. Classical model of a lineshape of atomic absorption.
2. Natural line broadening
3. Doppler broadening of an atomic/molecular transition
4. Collisional broadening of an atomic/molecular transition
5. Transition linewidth broadening mechanisms
6. Dispersive elements for applications in spectroscopy
7. Processes involved in laser action
8. Monochromators: operational principle and applications
9. Beer-Lambert law and its application in spectroscopy
10. Laser spectroscopy with cavities
11. Fluorescence excitation spectroscopy
12. Spectroscopy methods using lasers
13. Ionization spectroscopy
14. Frequency combs: principle of operation
15. Continuous wave laser spectroscopy enabled by frequency combs
16. Applications of frequency combs
17. Doppler-free saturation spectroscopy
18. Polarization spectroscopy
19. Doppler free two-photon spectroscopy
20. Ionization methods for mass spectroscopy
21. Mass spectroscopy: exemplary methods, applications, principles
22. Quadrupole mass filter: principle of operation, applications
23. Penning trap: principle of operation, applications
24. Photoassociation spectroscopy: principles, experimental signatures, applications
25. Feshbach spectroscopy
26. Measurements of binding energies of molecules
27. Quantum logic spectroscopy: principle of the method, applications
28. Quantum jump spectroscopy: principle of the method, applications
29. Principles and applications of Raman spectroscopy