



ACROSS

- 1 An element's emission _____ is the relative intensity of electromagnetic radiation of each frequency it emits when it is excited.
- 4 A _____ body is an object that absorbs all electromagnetic radiation that falls onto it. No radiation passes through it and none is reflected.
- 6 An electron _____, also known as a main energy level, is a group of atomic orbitals with the same value of the principal quantum number.
- 11 _____ mechanics is the study of the relationship between energy quanta and matter, in particular between photons and valence shell electrons.
- 12 _____ particles consist of two protons and two neutrons bound together into a particle identical to a helium nucleus.
- 13 The _____ exclusion principle explains why matter occupies space exclusively for itself and does not allow other material objects to pass through it, while at the same time allowing light and radiation to pass.
- 15 The electron _____ is the arrangement of electrons in an atom, molecule, or other physical structure such as a crystal.
- 16 The quantum _____ of a system corresponds to a set of numbers that fully describe a quantum system.
- 17 The _____ quantum number has the greatest correlation to energy of the quantum numbers describing the unique quantum state of an electron in an atom.
- 22 A _____ is the smallest particle still characterizing a chemical element
- 23 _____s are any of the several different forms of an element with nuclei having the same number of protons but

- different numbers of neutrons.
- 24 The _____ model depicts the atom as a small, positively charged nucleus surrounded by electrons that travel in circular orbits around the nucleus.
- 25 The _____ model showed that the plum pudding model of the atom of J. J. Thomson was incorrect, presenting the atom as containing a central charge concentrated into a very small volume in comparison to the rest of the atom.
- 26 A _____ state of a system is any quantum state of the system that has a higher energy than the ground state.
- 28 _____'s rules are a simple set of rules used to determine the term symbol that corresponds to the ground state of a multi-electron atom.
- 29 _____ is a chemical element represented by the symbol H and an atomic number of 1.

DOWN

- 2 The Heisenberg _____ principle gives a lower bound on the product of the standard deviations of position and momentum for a system, implying that it is impossible to have a particle that has an arbitrarily well-defined position and momentum simultaneously.
- 3 The purpose of Robert Millikan and Harvey Fletcher's _____-drop experiment (1909) was to measure the electric charge of the electron.
- 5 The law of definite _____ states that a chemical compound always contains exactly the same proportion of elements by mass.
- 6 Observation of the phenomenon of Rutherford _____ of alpha particles incident on gold foil led to the development of the orbital theory of the

- atom.
- 7 The _____ is a fundamental subatomic particle that carries a negative electric charge.
- 8 A _____ leap is a change of an electron from one energy state to another within an atom.
- 9 An atomic _____ is a mathematical description of the region in which an electron may be found around a single atom.
- 10 _____ is the angular momentum intrinsic to a body, as opposed to orbital angular momentum, which is the motion of its center of mass about an external point.
- 12 The _____ is used to determine the electron configuration of an atom, molecule or ion, postulating a hypothetical process in which an atom is built up by progressively adding electrons.
- 14 Ernest _____ was a nuclear physicist who pioneered the orbital theory of the atom through his discovery of scattering off the nucleus with his gold foil experiment.
- 18 _____ rays are streams of electrons observed in vacuum tubes.
- 19 The _____ is a subatomic particle with no net electric charge and a mass that is slightly more than a proton
- 20 _____ electrons are the electrons contained in the outermost electron shell of an atom.
- 21 The _____ is a subatomic particle with an electric charge of one positive fundamental unit, a diameter of about 1.5 fm femtometer, and a mass that is about 1836 times the mass of an electron.
- 27 A _____ is an atom or molecule which has lost or gained one or more electrons, making it negatively or positively charged.