



UČNI NAČRT PREDMETA / SUBJECT SPECIFICATION

Predmet:	Atomska fizika
Subject Title:	Atomic physics

Študijski program Study programme	Študijska smer Study field	Letnik Year	Semester Semester
FIZIKA PHYSICS	-	1 ali 2	1 ali 2

Univerzitetna koda predmeta / University subject code:

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Labor work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
45	30	-	-	-	375	15

Nosilec predmeta / Lecturer:

Jeziki /	Predavanja / Lecture:	<input type="text" value="slovenski"/>
Languages:	Vaje / Tutorial:	<input type="text" value="Slovenski"/>

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

Prerequisites:

Vsebina:

- atom z enim elektronom (vodikov atom, centralno polje, elektronska stanja, razcep nivojev, prehodi s sevanjem, fotoionizacija, vodiku podobni atomi)

- atom z dvema elektronom (Paulijev princip, simetrije valovnih funkcij, samousklajeno polje)

- lahki atomi (lupinski model, sklopitve, fina struktura)

- težji atomi (sheme za seštevanje vrtilnih količin, korelacije in skupinski učinki)

- vzbujeni atomi in ioni

- programski paketi za atomske izračune

Content (Syllabus outline):

- one-electron atom (hydrogen atom, central field, electronic states, splitting of levels, radiative transitions, photoionization, hydrogen-like ions)

- two-electron atom (Pauli principle, symmetry of atomic wave-functions, self-consistent field)

- light atoms (shell model, coupling, fine structure)

- heavy atoms (coupling schemes, correlations and collective effects)

- excited atoms and ions

- program packages for atomic calculations

Temeljni literatura in viri / Textbook:

R. D. Cowan: The theory of atomic structure and spectra, University of California Press, 1981
B. M. Smirnov, Physics of atoms and ions, Springer, 2003
K. G. Dyall: GRASP – Users' Manual, Oxford, 1988

Cilji:

Objectives:

Študentje pridobijo poglobljeno razumevanje zgradbe in lastnosti atoma ter procesov v atomu.

Students obtain deep understanding of atomic structure, properties of atoms and atomic processes.

Predvideni študijski rezultati:

Znanje in razumevanje:
Študentje razumejo principe metod za izračunavanje energij elektronskih stanj v atomih in verjetnosti za prehode, poznajo območja veljavnosti posameznih približkov, znajo izbrati ustrezno metodo in interpretirati rezultate.
Prenesljive/ključne spretnosti in drugi atributi:
Razumevanje atomskih procesov, kritičen odnos do uporabe posameznih približkov, poznavanje in uporaba programskih paketov.

Intended learning outcomes:

Knowledge and Understanding:
Students understand concepts of methods for calculation of energies of electronic states and transition probabilities in atoms, they are acquainted with reliability range of respective methods, they are able to select the appropriate method and interpret the results.
Transferable/Key Skills and other attributes:
Understanding of atomic processes, critical attitude to use of respective approximations, acquaintance with program packages and their use.

Metode poučevanja in učenja:

Predavanja
Seminarska naloga

Learning and teaching methods:

Lectures
Seminar work

Načini ocenjevanja:

Seminarska naloga
Ustni izpit

Delež (v %) /
Weight (in %)

50 %
50 %

Assessment:

Seminar work
Oral exam

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Seminarska naloga	50 %	Seminar work
Ustni izpit	50 %	Oral exam