

**ИЗБОРНОМ И НАСТАВНО-НАУЧНОМ ВЕЋУ
ФИЗИЧКОГ ФАКУЛТЕТА УНИВЕРЗИТЕТА У БЕОГРАДУ**

На VII редовној седници Изборног и наставно-научног већа Физичког факултета Универзитета у Београду одржаног 24. априла 2019. године одређени смо у Комисију за припрему извештаја по расписаном конкурс за избор једног РЕДОВНОГ ПРОФЕСОРА за ужу научну област ПРИМЕЊЕНА ФИЗИКА на Физичком факултету Универзитета у Београду. У том својству подносимо Већу следећи

РЕФЕРАТ

На конкурс за избор једног РЕДОВНОГ ПРОФЕСОРА за ужу научну област ПРИМЕЊЕНА ФИЗИКА на Физичком факултету Универзитета у Београду, који је објављен у листу Националне службе за запошљавање „ПОСЛОВИ“ од 15.05.2019. године, јавио се један кандидат, др Милош Вићић, ванредни професор Физичког факултета Универзитета у Београду.

БИОГРАФИЈА, НАСТАВНА И НАУЧНА АКТИВНОСТ КАНДИТАДА

1. Основни биографски подаци

Проф. др Милош Вићић рођен је 24.12.1961. године у Београду. Основну школу и гимназију је завршио у Београду. Милош Вићић је дипломирао физику 1990. године на Физичком факултету Универзитета у Београду на истраживачком (експерименталном) смеру.

Магистарски рад под називом "Трохоидни електронски спектрометар и мерење вибрационе побуде молекула азота" одбранио је 1994. године на Катедри за физику атома и молекула Физичког факултета Универзитета у Београду. Докторирао је 1999. године на Физичком факултету Универзитета у Београду под руководством др Драгољуба Белића са темом: "Резонантно побуђивање вибрационих нивоа двоатомских и вишеатомских молекула електронима ниских енергија".

Кандидат заснива стални радни однос са Физичким факултетом Универзитета у Београду током основних студија 1987. године као техничар у Лабораторији за атомске сударне процесе. По завршетку студија Милош Вићић постаје прво асистент-приправник, а затим, 1994. године, асистент Физичког факултета и држи експерименталне вежбе на више предмета.

У новембру 1999 године одлази на постдокторске студије у САД на Вашингтон Универзитет у Сент Луису (Washington University in Saint Louis). Године 2003. бива изабран у наставно звање: "Instructor in Radiation Oncology Physics" на Вашингтон Универзитету. У јулу 2006. године прелази у Хјустон на Онколошки Центар М. Д. Андерсон Универзитета Тексаса (The University of Texas M. D. Anderson Cancer Center) где бива унапређен у звање "Assistant Professor".

У новембру 2011. године враћа се у Србију на Физички факултет Универзитета у Београду, где 2013 стиче звање "Виши научни сарадник", а 2014. године звање ванредног професора за ужу научну област Примењена физика.

2. Наставна активност

Као асистент на Физичком факултету у Београду др Вићић је учествовао у извођењу наставе (експерименталне вежбе) на предметима: *Физика атома* и *Основи Атомске физике* за студенте физике као и: *Физика I* за студенте физичке хемије. Поред редовне наставне активности на Физичком факултету, кандидат у се овом периоду посебно ангажује у

раду комисија Друштва физичара Србије за организацију такмичења ученика средњих школа.

У току боравка у Сједињеним америчким државама, кандидат држи бројне курсеве из области Монте Карло симулација радијационог транспорта за студенте - специјализанте Медицинске физике. Такође, у Хјустону при "The University of Texas Graduate School of Biomedical Sciences" учествује као ко-ментор при изради једне докторске тезе.

По повратку у Србију, професор Вићић се ангажује и игра кључну улогу у организовању и заснивању новог смера специјалистичких здравствених студија Медицинске физике, као заједничких студија Медицинског и Физичког факултета универзитета у Београду. На овим специјалистичким студијама држи наставу на више предмета и у сарадњи са проф. др Небојшом Милошевићем са Медицинског факултета, координише целокупни ток наставе.

На Физичком факултету у Београду држи наставу из предмета: *Дистрибуирани рачунарски системи, Програмирање комуникације рачунара, Архитектура рачунара и оперативни системи, Масена спектрометрија и физика вакуума, Примена јонизујућег зрачења у медицини*. На докторским студијама Физичког факултета држи предмет: *Експерименталне методе биофизике*.

На Медицинском факултету Универзитета у Београду у оквиру докторских студија на енглеском језику држи наставу на предмету *Biomechanics*.

Аутор је једног рецензираног универзитетског уџбеника: "Основи физике радијационе терапије".

3. Научна активност

Научни интереси др Милоша Вићића могу се грубо сврстати у две дистинктне категорије: експериментална физика атома и молекула и физика радијационе онкологије. Успешност кандидата у области

експерименталне физике атома и молекула илустрована је чињеницом да је др Вићић је дизајнирао и конструисао два иновативна експериментална уређаја (радови 2 и 7 у приложеном списку радова). Током рада на Универзитету Тексаса, кандидат је руководио клиничким увођењем новог модалитета у планирању радијационе терапије (волуметријски модулисана лучна терапија).

На позив уредника, др Милош Вићић је рецензирао више радова у часописима *Journal of Applied Clinical Medical Physics* и *Medical Physics*. Наведени часописи подпадају у категорију M21.

Др Милош Вићић је објавио 29 радова у међународним часописима (ИФ > 1) од тога 5 након предходног избора. Наведени радови су цитирани 862 пута (без аутоцитата и цитата коаутора). Укупан импакт фактор наведених радова је 84,386.

Такође, кандидат има 40 саопштења на међународним научним скуповима.

4. Преглед научних резултата

1. **Vičić M**, Poparić G, Belić D.S., Large vibrational excitation of N₂ by low-energy electrons, *Journal of Physics B: Atomic, Molecular and Optical Physics*, **29**(6), 1273-1281 (1996)

У овом раду проучавана је побуда молекула азота сударом електрона у интервалу енергија 0-5 eV. Енергијска зависност резонантне побуде првих десет вибрационих нивоа азота је мерена помоћу двоструког трохоидног електронског спектрометра. Добијени релативни диференцијални пресеци су нормирани на апсолутне пресеке из литературе и упоређени са предходним експерименталним и теоријским резултатима. У функцијама ексцитације појединих вибрационох нивоа, по први пут су уочене извесне субструктуре предвиђене предходним теоријским радовима.

2. **Vičić, M.**, Poparić, G., and Belić, D. S., A crossed beam double trochoidal electron spectrometer. *Review of scientific instruments*, **69**(5), 1996-1999 (1998)

Овај рад даје опис новосаграђеног трохоидног електронског спектрометра. Примењена је иновативна метода укрштања електронског и гасног снопа која значајно повећава ефикасност детекције расејаних електрона. Уређај је тестиран мерењем вибрационе побуде молекула азота на ниским енергијама. Услед ванредно добре резолуције на мереним спектрима запажају се структуре које до сада нису биле забележене у литератури.

3. Poparić, G., **Vičić, M.**, and Belić, D. S., Vibrational excitation of the C $^3\Pi_u$ state of N₂ by electron impact. *Chemical physics*, **240**(1), 283-289 (1999)

Мерени су релативни диференцијални пресеци за побуду вибрационих нивоа C $^3\Pi_u$ стања молекула азота сударом електрона у интервалу енергија од прага до 17 eV и нулти угао расејања. Предпостављајући више могућих угаоних дистрибуција пресека за дати енергијски интервал, израчунати су диференцијални и интегрални вибрациони пресеци и тотални пресек за побуду C $^3\Pi_u$. Добијени резултати показују знатно одступање од ранијих мерења. Резонантне структуре су уочене у функцијама ексцитације за сва три вибрациона нивоа и њихов положај упоређен са подацима из литературе за друге канале распада.

4. Poparic, G., Vicic, M. and Belic, D.S., Near-threshold excitation of the E³ Σ_g^+ state of N₂ by electron impact, *Physical Review A*, **60**(6), 4542-4545 (1999)

Мерени су диференцијални пресеци за ексцитацију E³ Σ_g^+ стања молекула N₂ за расејање унапред. Мерења су вршена помоћу двоструког трохоидног електронског спектрометра. Добијени релативни пресеци су

ренормирани на апсолутну скалу истовременим мерењем вибрационе ексцитације $v=8$ основног стања N_2 преко $^2\Pi_g$ резонанце. Добијени резултати су упоређени са постојећом литературом.

5. Poparić, G., **Vičić, M.**, and Belić, D. S., Near-threshold excitation of the $b\ ^3\Sigma^+$ state of carbon-monoxide by electron impact. *Journal of Physics B: Atomic, Molecular and Optical Physics*, **34**(3), 381 (2001)

Мерени су релативни диференцијални пресеци за побуду стања $b\ ^3\Sigma^+$ молекула угљен монооксида електронским сударом, за расејање унапред у околини прага. Пресеци су мерени директно помоћу трохоидног електронског спектрометра високе резолуције директном детекцијом расејаних електрона. По први пут су на енергији прага до 15 eV израчунати апсолутни диференцијални пресеци за угао 0 путем нормирања. Интегрални пресеци су добијени помоћу релативних угаоних расподела из предходних мерења.

6. Poparić, G. B., **Vičić, M. D.**, and Belić, D. S., Differential cross sections at 0° and 180° for electron-impact excitation of the $E\ ^3\Sigma_g^+$ state of N_2 . *Physical Review A*, **66**(2), 022711 (2002)

Мерени су релативни диференцијални пресеци за ексцитацију $E\ ^3\Sigma_g^+$ стања молекула N_2 сударом електрона под углом од 0 и 180 степени у резонантном подручју енергија близу прага. Пресеци су мерени помоћу двоструког трохоидног спектрометра и нормирани су на апсолутне вредности поређењем са калибрационим мерењима вредности пресека за $^2\Pi_g$ резонанцу. Доприноси расејања под 0 и 180 степени су раздвојени употребом `time-of-flight` технике. Добијени резултати директно потврђују теоријску претпоставку о симетричности угаоне расподеле пресека.

7. **Vičić, M.**, Sobotka, L. G., Williamson, J. F., Charity, R. J., and Elson, J. M., Fast pulsed UV light source and calibration of non-linear photomultiplier response. *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, **507**(3), 636-642 (2003)

Развијен је нови уређај: ултраљубичасти импулсни извор светлости са дигиталном контролом амплитуде. Уређај је употребљен за мерење одзива фотомултипликатора BURLE 8850 на импулсе светлости који одговарају појединачним фотоелектронима па све до импулса чији интензитет изазива нелинеарни одзив. Овај рад је посебно значајан јер представља потпуно оригиналан уређај који омогућава ванредно прецизну калибрацију светлосних сензора. Уређај је први директни дигитално-светлосни конвертор забележен у литератури.

8. Ali, I., Costescu, C., **Vičić, M.**, Dempsey, J. F., and Williamson, J. F., Dependence of radiochromic film optical density post-exposure kinetics on dose and dose fractionation. *Medical physics*, **30**, 1958 (2003)

За радиоохроматски филм (RCF) је доказано да представља тачан и прецизан секундарни планарни дозиметар за интензивна радијациона поља. Међутим, његова употреба у брахитерапији ниског интензитета се доводи у питање услед могућег ефекта брзине експозиције. Овај рад разматра управо ове ефекте у широком интервалу брзина експозиције. Узорци филма су озрачивани дозама од <1 Gy до 100 Gy за различите интервале времена. Мерено је затамањење (оптичка густина) филма за различите експозиције као и временска зависност развоја затамњења. Из квантитативних резултата мерења развијен је прост емпиријски модел временске еволуције затамњења RCF. Добијени резултати указују да је RCF могуће користити за дозиметрију ниско-интензивних брахитерапијских извора али и да су потребна детаљнија мерења и модели.

9. El Naqa, I., Kawrakow, I., Fippel, M., Siebers, J. V., Lindsay, P. E., Wickerhauser, **M. Vičić.**, ... and Deasy, J. O., A comparison of Monte Carlo dose calculation denoising techniques. *Physics in medicine and biology*, **50**(5), 909 (2005)

Монте Карло (МС) симулације радијационог транспорта су један од најзначајнијих и најпоузданијих метода израчунавања дистрибуције дозе у медицинској физици. Скорашња истраживања показују да је могуће значајно скратити време рачунарских МС симулација методама селективног изглађивања (smoothing) статистичких флуктуација. Ови поступци смањују статистички шум те се у литератури користи термин `denoising` (DN). У овом раду су поређене нове као и већ публиковане DN технике укључујући: 3D wavelet threshold denoising with sub-band adaptive thresholding (3DWTD), content adaptive mean-median-hybrid (CAMH) filtering, locally adaptive Savitzky-Golay curve-fitting (LASG), anisotropic diffusion (AD) као и метод итеративне редукције шума формулисане као проблем оптимизације (IRON). Ефективност DN метода мерена је на три начина: кватификованјем средње квадратне грешке у односу на референтну малшумну дистрибуцију, евалуацијом максималног одступања од референце и Van Dyk-овим критеријумом. Иако све наведене DN методе показују значајне добитке на рачунарској ефикасности LASG се показао као најефективнији метод за три (од укупно четири) опитне геометрије. 3DWTD метод се показао ефикаснијим у случају IMRT фантома главе и врата.

10. Blanco, A. I., Chao, K. S., El Naqa, I., Franklin, G. E., Zakarian, K., **Vičić, M.**, and Deasy, J. O., Dose–volume modeling of salivary function in patients with head-and-neck cancer receiving radiotherapy. *International Journal of Radiation Oncology* Biology* Physics*, **62**(4), 1055-1069 (2005)

Овај рад изучава факторе који утичу на саливаторну функцију пацијента после радиотерапије главе и врата. На 65 пацијената са тумором главе или врата третираних радиотерапијом извршена је проспективна

студија саливаторне функције. Упореджени су хистограми доза-запремина са функционалношћу лучења пљувачке (мереном пре и после терапије). Уочене корелације су омогућиле моделирање исхода терапије у зависности од облика хистограма доза-запремина.

11. Lin, L. L., Mutic, S., Malyapa, R. S., Low, D. A., Miller, T. R., **Vićić, M.**, ... and Grigsby, P. W., Sequential FDG-PET brachytherapy treatment planning in carcinoma of the cervix. *International Journal of Radiation Oncology* Biology* Physics*, **63**(5), 1494-1501 (2005)

Овај рад евалуира предности секвенцијалне F-18-fluorodeoxyglucose positron emission томографије (FDG-PET) у планирању брахитерапије cervix-a. У овој проспективној студији била су укључена 24 пацијента. Пацијенти су снимани наведеном методом: дијагностички пре, секвенцијално за време и дијагностички 3 месеца после терапије. Поређења са планираном дозом показују да су абсорбоване дозе у бешици и ректуму значајно веће од препорука Међународне комисије за радијационе јединице и мере. Такође, рад закључује да секвенцијална FDG-PET потенцијално може послужити за знатно тачније планирање радијационог третмана.

12. El Naqa, I., Bradley, J., Blanco, A. I., Lindsay, P. E., **Vićić, M.**, Hope, A., and Deasy, J. O., Multivariable modeling of radiotherapy outcomes, including dose-volume and clinical factors. *International Journal of Radiation Oncology* Biology* Physics*, **64**(4), 1275-1286 (2006)

Вероватноћа специфичног исхода радијационе терапије је типично комплексна непозната функција дозиметријских и клиничких фактора. Модели који су у садашњој употреби су по правилу превише прости. У овом раду су описани напредни методи за мултиваријабилно моделирање исхода радијационе терапије.

13. Hope, A. J., Lindsay, P. E., El Naqa, I., Alaly, J. R., **Vičić, M.**, Bradley, J. D., and Deasy, J. O., Modeling radiation pneumonitis risk with clinical, dosimetric, and spatial parameters. *International Journal of Radiation Oncology* Biology* Physics*, **65**(1), 112-124 (2006)

Моделовање исхода радиационе терапије представља не-тривијалан проблем. Овај рад представља мултиваријабилни модел за одређивање вероватноће радијационог пнеумонитиса (RP) који често настаје као последица радијационе терапије тумора плућа. Модел је развијен уз помоћ клиничких података за 214 пацијената.

14. Poparić, G. B., Belić, D. S., and **Vičić, M. D.**, Resonant vibrational excitation of CO by low-energy electrons. *Physical Review A*, **73**(6), 062713 (2006)

У овом раду изучавана је вибрациона побуда молекула CO преко $^2\Pi$ резонанце у интервалу енергија 0-4 eV. Мерена је енергијска зависност резонантне побуде за првих десет вибрационих нивоа ($v=1$ до $v=10$) уз помоћ трохоидног електронског спектрометра. Добијени релативни пресеци су нормирани на апсолутне вредности. Интегрални пресеци су израчунати из раније мерених угаоних дистрибуција расејања. У кривама ексцитационе функције уочене су извесне, раније непознате, структуре.

15. Stojadinović, S., Low, D. A., **Vičić, M.**, Mutic, S., Deasy, J. O., Hope, A. J., ... and Grigsby, P. W., Progress toward a microradiation therapy small animal conformal irradiator. *Medical physics*, **33**, 3834 (2006)

Микрорадијациона терапија (microRT) је нова техника са сврхом да омогући конформално озрачивање малих животиња и тиме пружи метод за квантитативну евалуацију ефективности радијационог третмана. У овом раду предложен је дизајн новог microRT уређаја заснованог на високо интензивним цилиндричним ^{192}Ir радиоактивним извором и волфрамским колиматором. Геометрија уређаја је моделована Монте Карло симулацијама радијационог транспорта за три растојања извор-мета (50, 60, и 70 mm) као и пет величина кружног радијационог поља (5, 7.5, 10, 12.5, и 15 mm). Дистрибуције дозе су рачунате на воденом фантому димензија 50 X 50 X 50 mm³. Такође, извршена су мерења са прототипом колиматора пречника 3 mm ради верификације употребљеног Монте Карло модела.

- 16.El Naqa, I., Low, D. A., Bradley, J. D., **Vičić, M.**, and Deasy, J. O.,
Deblurring of breathing motion artifacts in thoracic PET images by
deconvolution methods. *Medical physics*, **33**, 3587 (2006)

У савременој клиничкој пракси честа је употреба FDG-PET томографије за снимање торакалних тумора. Дисање пацијента узрокује значајне помераје оваквих тумора и деградира квалитет добијеног снимка. У овом раду демонстрирана је техника изоштравања слике заснована на геометријској предикцији кретања ткива у комбинацији са деконволуционим методама. Овај метод је примењен на два сета података: клиничким снимцима и специјалном фантому који симулира кретање мете.

- 17.El Naqa, I., Suneja, G., Lindsay, P. E., Hope, A. J., Alaly, J. R., **Vičić, M.**, ... and Deasy, J. O., Dose response explorer: an integrated open-source tool for exploring and modelling radiotherapy dose-volume outcome relationships. *Physics in medicine and biology*, **51**(22), 5719 (2006)

Овај рад описује новоразвијени софтверски алат којим се омогућава моделирање исхода радијационе терапије.

- 18.Lindsay, P. E., El Naqa, I., Hope, A. J., **Vičić, M.**, Cui, J., Bradley, J. D., and Deasy, J. O., Retrospective Monte Carlo dose calculations with limited beam weight information. *Medical physics*, **34**, 334 (2007)

У последњој деценији прошлог века извршен је прелазак израчунавања дистрибуције дозе у пацијенту, приликом радиотерапије, са хомогеног (тело пацијента апроксимирано водом) на хетерогени случај (узима се у обзир различитост електронске густине појединих органа). Ради успешније анализе исхода радиотерапије пацијената планираних и третираних старијом методом пожељно је ретроспективно прерачунати дистрибуције доза узимајући у обзир хетерогености ткива. Отежавајућу околност представља чињеница да архивирани планови радијационог третмана не садрже информацију о релативним тежинама појединачних експозиција. У овом раду представљен је метод којим је могуће ретроспективно реконструисати ову информацију и тиме прерачунати дозу за хетерогени случај.

- 19.Lin, L. L., Mutic, S., Low, D. A., LaForest, R., **Vičić, M.**, Zoberi, I., ... and Grigsby, P. W., Adaptive brachytherapy treatment planning for cervical cancer using FDG-PET. *International Journal of Radiation Oncology* Biology* Physics*, **67**(1), 91-96 (2007)

У овом раду описана је дозиметријска студија са сврхом да упореди конвенционалну и оптимизовану интракавитарну брахитерапију цервикалног канцера. Употреба FDG-PET томографије омогућила је детерминацију покривености дозом туморске запремине. Стандардни план третмана испоручује 6,5 Gy у тачку А тумора, док оптимизовани план креира 6,5 Gy изодозну површину која се преклапа са туморском границом

утврђеном са FDG-PET-ом. У овој проспективној студији третиран је 31 пацијент.

- 20.Stojadinović, S., Low, D. A., Hope, A. J., **Vičić, M.**, Deasy, J. O., Cui, J., ... and Grigsby, P. W., MicroRT—Small animal conformal irradiator. *Medical physics*, **34**, 4706 (2007)

У овом раду описан је уређај (microRT) помоћу којег је могуће вршити конформалну ирадијацију малих животиња. Уређај користи ^{192}Ir високоактивни брахитерапијски извор и волфрамске колиматоре.

- 21.Klein, E. E., **Vičić, M.**, Ma, C. M., Low, D. A., and Drzymala, R. E., Validation of calculations for electrons modulated with conventional photon multileaf collimators. *Physics in medicine and biology*, **53**(5), 1183 (2008)

У овом раду презентован је нови модалитет електронске радиотерапије. Третман електронима представља посебан изазов услед потребе за задовољењем неколико противуречних захтева: неопходност постизања хомогене дистрибуције дозе у тумору, конформалност, те поштеда дисталних органа. У ову сврху, стандардни клинички акцелератор са фотонским мултисегментним колиматором је модификован да омогући модулацију електронског снопа. Извршено је поређење прорачуна дистрибуције дозе Монте Карло симулацијама и мерењима на фантому и постигнуто ванредно добро слагање. Такође, утврђена је оптимална геометрија за постизање максимално хомогене и конформалне дистрибуције дозе.

- 22.Arjomandy, B., Tailor, R., Anand, A., Sahoo, N., Gillin, M., Prado, K., and **Vičić, M.**, Energy dependence and dose response of Gafchromic

EBT2 film over a wide range of photon, electron, and proton beam energies. *Medical physics*, **37**, 1942 (2010)

У овом раду извршена је карактеризација новог EBT2 радиоохроматског филма. Узорци филма су експонирани различитим изворима: киловолтним Ro уређајима (75, 125 и 250 kVp), радиоактивним гама изворима (^{137}Cs и ^{60}Co), мегаволтним фотонским акцелераторима (6 и 18 MeV) те протонима (100 и 250 MeV) у распону доза 0,4–10 Gy. Утврђена је зависност оптичке густине зацрњења филма од зависности од дозе и извора зрачења.

23.Vojnovic, M., Popovic, M., Ristic, M.M., **Vicic, M.D.** and Poparic, G.B., Rate coefficients for electron impact excitation of CO, *Chemical Physics*, **423**, 1-8 (2013)

У овом раду израчунати су коефицијенти брзине за електронску побуду молекула CO како за равнотежне тако и неравнотежне плазме у присуству електричних и магнетних поља. Приликом одређивања коефицијената брзине у обзир су узети сви релевантни нееластични процеси: ротациона побуда, вибрациона побуда, електронска побуда у синглетна и триплетна стања као и јонизација. За неравнотежне услове било је потребно утврдити електронске дистрибуције по енергијама. Ово је постигнуто Монте Карло симулацијама развијеним у нашој лабораторији.

24.Popovic, M.P., Vojnovic, M.M., M.M., Ristic, M.M., **Vicic, M.D.** and Poparic, G.B., Ionization of N-2 in radio-frequent electric field, *Physics of Plasmas***21**(6), 063504 (2014)

Коефицијенти брзине за електронску сударну јонизацију за молекул азота су рачунати за неравнотежна стања у присуству временски зависних електричних поља. Функције неравнотежне расподеле електронске енергије унутар једног периода радиофреквентног поља су одређиване

путем Монте Карло симулација. Уз помоћ овако одређених функција, рачунати су временски разлучени (унутар једног периода) коефицијенти брзине у фреквентном опсегу од 13,56 до 500 MHz.

- 25.Vojnovic, M., Popovic, M., Ristic, M.M., **Vicic, M.D.** and Poparic, G.B., Rate coefficients for electron impact excitation of N-2, *Chemical Physics*, **463**, 38-46 (2015)

Лабораторија за електронске сударне процесе Физичког факултета Универзитета у Београду је развила софистицирани код за Монте Карло симулације кретања електрона у плазмама. У овом раду је поменути код искоришћен за одређивање енергијске дистрибуције електрона у азотној плазми у присуству електричних и магнетних поља. Добијене дистрибуције су искоришћене за израчунавање коефицијената брзине.

- 26.Davidson, S.E., Cui, J., Kry, S., Deasy, J.O., Ibbott, G.S., **Vicic, M.**, White, R.A. and Followill, D.S., Modification and validation of an analytical source model for external beam radiotherapy Monte Carlo dose calculations, *Medical Physics*, **43**(8), 4842-4853 (2016)

Овај рад описује новоразвијену софтверску алатку помоћу које је могуће извршити израчунавање дозне дистрибуције унутар пацијента приликом терапије стандарним клиничким линеарним акцелераторима. Алгоритам овог алата комбинује велику тачност коју пружа Монте Карло метод радијационог транспорта за рачунање дозе са практичном декомпозицијом извора зрачења на неколико компоненти. Тачност алгоритма је проверена експерименталним методама.

- 27.Lukovic, M., Lukovic, V., Belca, I., Kasalica, B., Stanimirovic, I. and **Vicic, M.**, LED-based Vis-NIR spectrally tunable light source - the

optimization algorithm, *Journal of the European Optical Society - Rapid Publications*, **12**(19), (2018)

Употребом низа полупроводничких LED извора светлости, при чему сваки емитер има спектрални максимум на различитој таласној дужини, могуће је остварити композитни светлосни извор са арбитрарним спектром. У овом раду описан је нумерички метод који израчунава коефицијенте доприноса појединачних емитера у циљу постизања задане спектралне дистрибуције композитног извора.

28.Aoneas, M.M., Vojnovic, M.M., Ristic, M.M., **Vicic, M.D.** and Poparic, G.B., Ionization of CO in radio-frequency electric field, *Physics of Plasmas*, **24**(2), 023502 (2017)

Коефицијенти брзине за електронску сударну јонизацију за молекул угљен монооксида су рачунати за неравнотежна стања у присуству временски зависних електричних поља. Функције неравнотежне расподеле електронске енергије унутар једног периода радиофреквентног поља су одређиване путем Монте Карло симулација. Уз помоћ овако одређених функција, рачунати су временски разлучени (унутар једног периода) коефицијенти брзине у фреквентном опсегу од 13,56 до 500 MHz.

29.Lukovic, M., **Vicic, M.**, Popovic, Z., Zekovic, L. Kasalica, B. and Belca, I., Two-color pyrometer-based method for measuring temperature profiles and attenuation coefficients in a coal power plant, *Combustion Science and Technology*, **150**(11), 2018-2029 (2018)

У овом раду описана је нова метода и експериментални уређај за одређивање температурних профила и коефицијената атенуације у котловима електрана на угаљ. Уређај је заснован на двобојном пирометру. Резултати мерења су верификовани поредђењем са мерењима помоћу Вентуријевог пирометра (температурни профили) те узорковањем несагорелих честица хлађеном пробом (коефицијенти атенуације)

5. СПИСАК ПУБЛИКАЦИЈА

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- [A-2] Vicic, M., Poparic, G., and Belic, D.S. A crossed beam double trochoidal electron spectrometer. *Review of scientific instruments*, **69**(5), 1996-1999 (1998)
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- [A-3] Poparić, G., Vičić, M. and Belić, D.S. Vibrational excitation of the C ³Π_u state of N₂ by electron impact. *Chemical physics*, **240**(1), 283-289 (1999) IF = 1.766, M22
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IF = 2.332, M21a
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- [A-7] Vičić, M., Sobotka, L.G., Williamson, J.F., Charity, R J. and Elson, J.M., Fast pulsed UV light source and calibration of non-linear photomultiplier response. *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, **507**(3), 636-642 (2003)

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- [A-10] Blanco, A.I., Chao, K.S., El Naqa, I., Franklin, G.E., Zakarian, K., Vicic, M. and Deasy, J.O. Dose–volume modeling of salivary function in patients with head-and-neck cancer receiving radiotherapy. *International Journal of Radiation Oncology* Biology* Physics*, **62**(4), 1055-1069 (2005)

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- [A-11] Lin, L.L., Mutic, S., Malyapa, R.S., Low, D.A., Miller, T.R., **Vicic, M.**, LaForest, R., Zoberi, I. and Grigsby, P.W. Sequential FDG-PET brachytherapy treatment planning in carcinoma of the cervix, *International Journal of Radiation Oncology* Biology* Physics*, **63**(5), 1494-1501 (2005)

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Б) Монографије, уџбеници, помоћни уџбеници

Рецензирани уџбеници одобрени за коришћење у настави на основним и мастер студијама:

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6. ЦИТАТИ

Наведени списак цитата је пречишћен и **не** садржи аутоцитате нити цитате коаутора.

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ЗАКЉУЧАК

На конкурс за редовног професора са пуним радним временом за ужу научну област Примењена физика расписаном 15.05.2019. године у листу „Послови”, а по одлуци VII седнице Изборног наставно-научног већа Физичког факултета Универзитета у Београду од 24. априла 2019. године, јавио се један кандидат, др Милош Вићић. Кандидат на основу предходно изложених података из биографије и наставно-научног рада, испуњава услове за избор у звање редовног професора, предвиђене Законом о високом образовању Републике Србије, Правилником о условима за стицање звања наставника на Универзитету у Београду и Статутом Физичког факултета.

Научни рад кандидата резултирао је са 29 радова у међународним часописима са импакт фактором већим од 1. Од тога, 10 радова су објављени у часописима категорије M21a (међународни часописи изузетне вредности), 12 радова у часописима категорије M21 (врхунски међународни часописи), 4 рада у часописима категорије M22 (истакнути међународни часописи и 3 рада у часописима категорије M23. Укупни импакт фактор наведених радова је 84,386, тј. у просеку 2,91 по раду. Наведени радови су цитирани 862 пута без аутоцитата и цитата коаутора, односно преко 1000 пута ако се урачунају цитати коаутора. Након избора у звање ванредног професора кандидат је објавио 5 радова са импакт фактором већим од 1. На позив уредника, др Милош Вићић је рецензирао више радова у часописима категорије M21. Кандидат је учесник бројних домаћих и међународних научних конференција.

Наставна активност кандидата је одлично оцењена од стране студената са просечном оценом 4,67 (током последње 3 године). Посебан допринос кандидата се огледа у успешној руководећој улози на

формирању заједничких специјалистичких здравствених студија Медицинског и Физичког факултета Универзитета у Београду из области Медицинске физике. Кандидат је аутор једног рецензираног универзитетског уџбеника.

На основу изложеног, Комисија ПРЕДЛАЖЕ Изборном већу Физичког факултета да др Милоша Вићића изабере у звање и на радно место РЕДОВНОГ ПРОФЕСОРА за ужу научну област Примењена физика на Физичком факултету Универзитета у Београду.

У Београду, 05.06.2019.

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