Contribution ID: **83** Type: **Oral Presentation**

Resonant Ionization Spectroscopy for laser isotope separation of zinc isotopes

Friday, 29 June 2018 10:40 (20 minutes)

Resonant Ionisation Spectroscopy (RIS) refers to the selective excitation of a particular atomic isotope to an excited state by means of resonant light, followed by photo-ionisation and ion detection. 68Zn and 67Zn are important stable nuclides in medicine and industry as used to produce Gallium isotopes (68Ga and 67Ga) that are used in medical imaging such as Positron Emission Tomography (PET) and SPECT (single-photon emission computerised tomography) to detect inflammation, infection or cancer. The main aim of this project is to investigate, model and optimise RIS schemes for zinc (Zn) isotopes 68Zn and 67Zn that are suitable for laser-based separation of these isotopes from natural Zn. RIS will be used to obtain spectroscopic data on the transition wavelengths, hyperfine structure, and transition strengths of relevant energy levels. In this presentation an overview is given of the progress towards a RIS system for Zn. Potential excitation schemes and ion collection techniques, the sample temperature and laser bandwidth limitations have been identified by simulations. Experimental results from absorption, fluorescence and optogalvanic spectroscopy will be discussed. The choice between the $3d^{10}4s^2\ {}^1S_0$ - $3d^{10}4s4p\ {}^1P_1$ and the $3d^{10}4s^2\ {}^1S_0$ - $3d^{10}4s4p\ {}^1P_3$ transitions as first excitation step will be explained. The results generated thus far in this study will aid in the development of an optimised RIS system that may be applied in the commercial production of medical isotopes.

Please confirm that you
have carefully read the
abstract submission instructions
under the menu item
”Call for Abstracts”
(Yes / No)

Yes

Consideration for
student awards
Choose one option
from those below.
N/A
Hons
MSc
PhD

PhD

Supervisor details
If not a student, type N/A.
Student abstract submision
requires supervisor permission:
please give their name,
 institution and email address.

Dr. C.M. Steenkamp
Stellenbosch University
cmsteen@sun.ac.za

Primary author: Mr DE BRUYN, Andre (Laser Research Institute, Stellenbosch University)

Co-authors: Dr DU PLESSIS, Anton (Stellenbosch University); Dr STEENKAMP, Christine (University of Stellenbosch); Prof. ROHWER, Erich (University of Stellenbosch)

Presenter: Mr DE BRUYN, Andre (Laser Research Institute, Stellenbosch University)

Session Classification: Photonics

Track Classification: Track C - Photonics