

Virtuelles Seminar für Kern- und Radiochemie

Sommersemester 2021

Im virtuellen Seminar für Kern- und Radiochemie
des Departments Chemie

spricht am

Montag, dem 31.05.2021, 16:15 Uhr

A. Sårmark-Roth

(Department of Physics, Lund University, Sweden)

über:

***„Spectroscopy along decay chains of
element 114, flerovium“***

Jeweils montags, 16:15 Uhr

Das Seminar wird über die Plattform
„MS Teams“ abgehalten.

Beitritt erfolgt ab 15:45 über diesen [Link](#).

Bei technischen Problemen mit der
Einwahl steht an den Seminartagen ab
15:45 Herr Ernst Artes als
Ansprechpartner bereit. Er kann per
Email (erartes@uni-mainz.de)
oder Telefon (06131-39 25323) erreicht
werden.

Für die Professoren des Instituts:
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A. S mark-Roth

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Spectroscopy along Decay Chains of Element 114, Flerovium

In the wake of the discovery of superheavy elements, nuclear spectroscopy experiments aim at providing anchor points at the uppermost end of the nuclear chart for nuclear structure theory, which otherwise had to solely rely on extrapolations. In two runs in 2019 and 2020, such a nuclear spectroscopy experiment was conducted to study α -decay chains stemming from isotopes of decay chains stemming from isotopes of flerovium (element $Z = 114$).

The U310 experiment conducted at the GSI Helmholtzzentrum f r Schwerionenforschung, Darmstadt, Germany, employed an upgraded TASISpec decay station placed behind the gas-decay chains stemming from isotopes of filled separator TASCA. The fusion-decay chains stemming from isotopes of evaporation reactions $^{48}\text{Ca}+^{242}\text{Pu}$ and $^{48}\text{Ca}+^{244}\text{Pu}$ provided a total of 32 flerovium-decay chains stemming from isotopes of candidate decay chains in effectively 18 days of beam time. Two and eleven decay chains were firmly assigned to even-decay chains stemming from isotopes of even ^{286}Fl and ^{288}Fl isotopes, respectively. The – admittedly unexpected – observations include (i) an excited 0^+ state at 0.62(4) MeV excitation energy in ^{282}Cn , and (ii) a $Q_\alpha = 9.46(1)$ MeV decay branch (1 out of 51) from ^{284}Cn into ^{280}Ds [1]. Both observations indicate that there is hardly any shell gap at proton number $Z = 114$ -decay chains stemming from isotopes of at least not at neutron numbers $N \approx 172$ -decay chains stemming from isotopes of 174. The remaining decay chains stemming from ^{289}Fl indicate the presence of α -decay chains stemming from isotopes of decay fine structure as has been theoretically predicted for odd-decay chains stemming from isotopes of A Fl-decay chains stemming from isotopes of decay chains. This is the focus of an ongoing analysis [2].

[1] A. S mark-decay chains stemming from isotopes of Roth et al., Phys. Rev. Lett., 126, 032503 (2021).

[2] D.M. Cox et al., to be submitted to Phys. Rev. Lett.