

Springer

1st  
edition1st ed. 2019, XV, 102 p. 51  
illus., 45 illus. in color.**Printed book**

Hardcover

**Printed book**

Hardcover

ISBN 978-3-030-30777-6

£ 109,99 | CHF 153,50 | 129,99 € |  
142,99 € (A) | 139,09 € (D)

Available

**Discount group**

Science (SC)

**Product category**

Monograph

**Series**

Springer Theses

Physics : Nuclear Physics, Heavy Ions, Hadrons

Valverde, Adrian A., University of Manitoba, Winnipeg, MB, Canada

# Precision Measurements to Test the Standard Model and for Explosive Nuclear Astrophysics

- Nominated as an outstanding PhD thesis by the University of Notre Dame
- Provides an introduction to tests of the Standard Model via nuclear beta decays
- Presents advances in precision testing of the Standard Model
- Presents a Penning trap mass measurement for determining the astrophysical rp process pathway
- Gives an overview of the forthcoming Argonne facility for precision measurements of astrophysical processes

This thesis presents two significant results in the field of precision measurements in low-energy nuclear physics. Firstly, it presents a precise half-life determination of  $^{11}\text{C}$ , leading to the most precise  $t_{1/2}$ -value for a beta decay transition between mirror nuclides, an important advance in the testing of the electroweak sector of the Standard Model. Secondly, it describes a high-precision mass measurement of  $^{56}\text{Cu}$ , a critical nucleus for determining the path of the astrophysical rapid-proton capture process, performed by the author using the LEBIT Penning trap at the National Superconducting Cyclotron Laboratory. This new measurement resolves discrepancies in previously-reported calculated mass excesses. In addition, the thesis also presents the construction and testing of a radio-frequency quadrupole cooler and buncher that will be part of the future  $N = 126$  factory at Argonne National Laboratory aimed at producing nuclei of interest for the astrophysical rapid-neutron capture process for the first time.

Order online at [springer.com/booksellers](https://springer.com/booksellers)

Springer Nature Customer Service Center GmbH

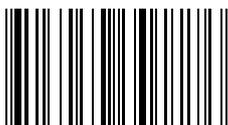
Customer Service

Tiergartenstrasse 15-17

69121 Heidelberg

Germany

T: +49 (0)6221 345-4301

[row-booksellers@springernature.com](mailto:row-booksellers@springernature.com)

ISBN 978-3-030-30777-6 / BIC: PHM / SPRINGER NATURE: SCP23010

Prices and other details are subject to change without notice. All errors and omissions excepted. Americas: Tax will be added where applicable. Canadian residents please add PST, QST or GST. Please add \$5.00 for shipping one book and \$ 1.00 for each additional book. Outside the US and Canada add \$ 10.00 for first book, \$5.00 for each additional book. If an order cannot be fulfilled within 90 days, payment will be refunded upon request. Prices are payable in US currency or its equivalent.

Part of **SPRINGER NATURE**